RAILROAD GAZETTE

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Contributions

The Census Report on Locomotive Building.

Washington, D. C., Oct. 9, 1902.

TO THE EDITOR OF THE RAILROAD GAZETTE:

My attention having been called to a recent editorial in your paper regarding the discrepancy between the census statistics of the output of locomotives and your own data on the same subject, I transmitted the same to Mr. Edward H. Sanborn, of Philadelphia, the expert agent of the Census Office, who prepared the report, and asked for an expression of his opinion upon the subject. I am to-day in receipt of a reply which seems to satisfactorily account for a discrepancy which he regards as due entirely to the fact that the two reports cover a different period of time.

S. N. D. NORTH, *Chief Statistician for Manufactures.*

Philadelphia, Oct. 7, 1902.

I am in receipt of your letter of Oct. 6 informing me of the question raised by the *Railroad Gazette* relative to the accuracy of the census figures concerning the output of locomotives in the census year. It does not appear to have been noted that the *Railroad Gazette* figures are for the calendar year 1900, while the census figures are for the year ended June 1, 1900. This difference in periods is alone sufficient to account for the difference in figures collected by the census and by the *Railroad Gazette*. In fact, the records of the Baldwin Locomotive Works for these two periods show a difference which would account for the entire difference between the census figures and those of the *Railroad Gazette*. The Baldwin Locomotive Works built 1,375 locomotives in the calendar year 1900, while in the fiscal year ended June 30, 1900, they built only 1,074; here is a difference of 301 locomotives and a similar difference in the figures shown by other establishments would undoubtedly account for the total of 379, which is the difference between the figures of the *Railroad Gazette* and those of the census.

I think there can be no question of the accuracy of the figures obtained by the Census Office.

EDWARD H. SANBORN, *Expert Agent.*

Some Thoughts on the Legal and the Social State of Electric Railroads.*

It is exceedingly appropriate that the twenty-first annual meeting of the American Street Railway Association should be held in the beautiful city of Detroit, for, while the city street railroads of the country have not been idle during the last year, the greatest development in electric railway work since our last convention, and in fact for several years, has been in the direction of interurban electric railways, and with this class of road Detroit railway enterprise has always been prominently identified. Radiating from this city can be found some of the largest and most modern of interurban railways, and Detroit ranks with Cleveland, Indianapolis, Cincinnati and Dayton as the important centers in this country of the interurban railroad industry. It is connected by high-speed electric railroads with Port Huron on the north and Toledo and Cleveland on the south and east, while the lines to the west extend with only a slight break as far as the eastern shore of Lake Michigan and will probably before long find entrance into Chicago.

The interurban railways have long since passed the stage when they could be considered simply as suburban extensions of city lines. They are doing a through business, which is constantly growing, and the later and more ambitious examples of roads of this class are built with a track construction inferior in no respect to the best practice of the steam railroad companies. They operate usually for the greatest part of their distance over private rights of way and attain speeds which enable them to compete successfully with their steam railroad rivals for nearly every class of traffic except long-distance passenger and freight business. This extension of the electric railroad has introduced new problems of discussion, such as fares, transportation of freight, etc., into the operating department, as well as the exercise of the most advanced electrical engineering methods, not only in the transmission of the power at high voltage necessary to operate the cars, but in the car equipment as well. Up to the present, direct current has been used on the trolley wire or third rail, but if the experiments with single-phase motors, which it is announced are soon to be tried, prove successful, the possibility of the direct application of alternating current to railway work will remove some of the inconveniences which now exist in the present system. . . .

Eleven years ago there were about 1,800 miles of electric railroads in the country, while to-day there are between 24,000 and 25,000 miles, and that against an investment 11 years ago in street railroads of about $75,000,000, the total capital invested to-day is in the neighborhood of two billion dollars. . . . Upon the orderly operation of a street railroad depends substantially everything else that goes on in a thickly settled community. It is true that what we are operating is a valuable privilege granted by the public, but its value depends chiefly upon the sufficiency with which the public is served and the public was moved to grant it solely from considerations of its own comfort and interest. The contract between the public and the street railroads, therefore, is a contract of partnership and the interest of the partners is identical. What the public wants is the best possible service and only by giving the best possible service can we obtain the largest possible returns for our money.

And yet, despite this close association of interest, it is the experience of all of us that there is scarcely any limit to the impositions which the public will permit, and rather cheerfully permit, to be laid upon street railroad corporations. Legislatures and boards of aldermen seem to regard street railroads as fair game to be hit at as often and as viciously as anybody chooses, and the public newspapers, so far from taking into account the service we are rendering and protecting us against the schemes of demagogues, are rather inclined to regard injuries so inflicted with amused indifference, if not with positive favor. . . . The contract, of which our charters and certificates of incorporation are the witnesses, authorizes us, as the universal law of business authorizes every one, so to employ our abilities and resources as to obtain from them the greatest possible result to ourselves and if, in recent years, street railroad shares have been especially good income earners, it is because the street railroad companies are meeting the public ends for which they were organized, because they have studied and facilitated the public interests and needs, because they have put themselves in advance of the development of the cities and towns they run through, because at vast expense they have introduced new methods, new machinery, swifter, more frequent and improved accommodations, and it has never been laid down by the courts that a contract could be broken and new conditions imposed because either of the parties to it had done better than was anticipated and certainly not because both had. And yet the contracts between the public and the street railroad companies are being continually infringed upon by the imposition of new taxes and new requirements and it has come to be considered almost an impertinence for a corporation so injured to offer ever so mild a protest.

In the theory of the law a corporation is an individual, but apparently only for the purpose of enabling it to be got at. It has all the obligations of individuals, but of their rights few. The politicians of all parties talk themselves hoarse with eloquent protestations of their love of individual liberty and individual rights, and so well have their laws justified these pretensions that no man in this country is so idle, so worthless, so bereft by his own acts of character, property or position but that if he contrives to keep out of prison he has a vote and the opportunity of making his equal influence felt in the determination of public questions. But a corporation, even such a corporation as is organized to serve the public convenience, may neither vote nor in any other way participate in making the laws by which it must be bound. . . .

Wars have been fought and governments formed to vindicate the principle that there shall be no taxation without representation, but if a corporation should ask to be represented in a public body that had the power of taxation and was proposing to exercise it upon corporations, its action would be observed with indignation and amazement. Even in the courts its standing is prejudiced, and before a jury sworn to render an impartial verdict upon the facts its first and constant care is to remove from the minds of the jurymen a frankly admitted antagonism. It is not remarkable that in this situation the law should discriminate against corporations. . . . I look forward to the day when the shareholders in street railroad corporations will stand up for their rights as shareholders in the same sturdy spirit which they would at once bring to the defense of their rights as individuals. . . .

I have already referred to the immense mileage of interurban electric railroads which has been built during the last few years, espcially in the Middle West. Many of these roads are hauling freight and it is a matter of great importance, not only to these roads themselves, but to the cities and towns which they serve, that the facilities which they should enjoy as regards the interchange of freight with the steam railroads should be as free as those between the steam railroads themselves. The first point requisite to this end is to have convenient connections with the neighboring steam railroads, so that the freight cars can be passed from one to the other. The right of the electric company to demand this has only recently been decided in New York State in a case which was contested between the Hudson Valley Railway Company and the Boston & Maine Railroad Company, in which the Court of Appeals reversed the decision of the Appellate Division and rightly decided that an intersection and connection of the electric road and the steam road should be made in the interests of the local shippers. This right should be of great advantage to the electric railroad company, but the full benefit to the local shippers will not be derived until the full privileges of an interchange of freight cars between the two systems shall be as universally recognized as they now are between steam railroads, so that freight can originate on either the steam or electric road. Heretofore in many cases the steam railroad companies have shown an unwillingness to interchange freight with the competing electric roads, on the plea that the latter were not responsible in the same degree as the steam railroads, and by this means considerable freight transportation has been diverted from the electric railroad. . . .

While it may appear inadvisable to change the name of the American Street Railway Association to accord with the broader field of electric railroading in which many of its members are engaged, yet it should be understood that the association is not merely a street railroad organization, but its scope covers the entire field of electric transportation. More than this, it may seem desirable to welcome the participation of all companies engaged in electric railroad transportation, for the reason that there is no organization in the country which has accomplished so much or at its annual conventions and exhibitions can afford anywhere near the same opportunity for instruction to those interested in electric transportation in its different phases. Heretofore no manager or engineer of a trunk line company which is contemplating or has installed a system of electric traction could join this Association except as a representative of some street railroad company, but in view of the interest which is being taken in electric railway equipment by some of the large trunk line interests and the undeniable future which electric power will have for such transportation, especially for terminal and suburban work, the question will arise in the near future, if it has not already done so, whether the benefits which this Association can confer are available for companies which are not now eligible to membership. . . .

*Extracts from the Presidential address of Mr. H. H Vreeland at the Detroit Convention of the American Street Railway Association.

Possibilities in American Locomotive Design.*

BY W. F. M. GOSS.

The development of the American locomotive has been in response to conditions and influences which have changed from time to time. In the beginning, everything was experimental. Different engines varied greatly in form, and details which performed functions common to all were in different machines quite dissimilar in outline and construction. The period for which this was true constituted the pioneer days in locomotive design. Between 1850 and 1860, however, practice in this country began to settle itself along certain well-defined lines which were characterized by that general arrangement of boiler, cylinders, frames, and wheels which has since distinguished locomotives of the so-called American type.

Not only was the design thus chosen remarkably well adapted to the service expected of it, but the business conditions which influenced its production were such as tended to fix its character. Chief among these conditions may be mentioned the beginning of that era of American railroad extension, which represents the most remarkable industrial development that any country has ever seen. In a single decade, from 1850 to 1860, railroads in the United States increased from eight thousand miles to 29 thousand miles, or 260 per cent.

The effect of this expansion upon the design of locomotives was great. As these thousands of miles of road extended themselves over the country, their equipment became necessary. Locomotives were in demand. These

*An address delivered at the Deer Park Convention of Baltimore & Ohio officers, Sept. 20, 1902.

could not often be supplied by the railroad companies themselves, for their energies were being expended in extending lines, and, in most cases, they were without facilities for producing them. In these early days the officials of the roads had little time in which to give either thought or suggestion concerning the details of equipment, and the builders of locomotives, with an abundance of orders in hand, and with no highly-organized staff of designers to study the needs of individual roads, followed naturally the lines of least resistance. It was to have been expected under these conditions that each builder would supply all customers with engines of the same general type, and it was equally natural that each should seek to strengthen his own practice by the experience of his neighbors. In this manner, each contributing something to the solution of the common problem, there gradually came into existence a distinct and generally-adopted design, the American-type locomotive, a development by experimental processes, from very early beginnings.

Meantime, railroad construction continued and increased. Throughout the three decades, between 1860 and 1890, it never ceased, the increase for each period being respectively 20 thousand, 39 thousand, and 75 thousand miles, the total mileage at the close of the eighties having reached the enormous aggregate of 163 thousand, or more than enough to go six times around the earth. All this made a demand for locomotives, and in supplying this demand, the interests of both builder and purchaser were best satisfied by an adherence to the previously developed design. The service to be rendered was generally similar to that which was being rendered by existing engines, and, hence, a design which was already in successful operation was a safe one to employ for proposed locomotives. These machines were often required for work at long distances from their base of supply and it was necessary that there should be the least possible liability to break-downs or failures; consequently it was not safe to risk innovations in design. The demand upon the builders was for numbers, not variety in design. How well the demand was met is illustrated by the fact that during this period an American locomotive builder, while maintaining a drafting-room force consisting of one man whose official title was architect and who had charge of the buildings about the premises as well as of the drawing room, turned out in a single year six hundred locomotives, a number greater than has since been equaled in a single year by the same works, except in the year just passed.

The merits of these machines of 20 and 30 years ago should not be underrated. With their 16 in. or 17 in. cylinders and 120 or 140 lbs. of steam, they carried good loads and ran at fair speeds. They responded perfectly to the demands of a mixed service, sometimes doing switching, sometimes pulling a freight, and sometimes a passenger train. They were sufficiently flexible to be but little affected by roughness of track, and their parts, being few and strong, were not often deranged or broken. The efficiency of these engines, both as to boiler performance and cylinder action, is probably not exceeded by that of the modern simple locomotive. When to these obvious advantages, there is added a low first cost and a low cost of repairs, the preference which has been accorded the American type is readily explained.

All this applies to the practice of American roads as a whole. I do not wish to be understood as implying that every individual road was necessarily equipped with the American type of engine. The fact is that some roads have from the beginning exercised a strong and commendable spirit of independence in the design of their locomotives, and of none is this more true than of the Baltimore & Ohio Railroad. Controlled by men of rare gift, designs for this road have always been more or less specialized, the purpose being to meet more perfectly the peculiar requirements of the service.

Finally, it should be observed that American engineers of 20 years ago took great credit to themselves for the uniformity observed in the construction of locomotives. We were inclined to extend sympathy to friends in other countries because of the variety of types with which they had to deal, both in construction and repairs, and we were not slow to call their attention to the greater ease with which the locomotives of this country could be manufactured and maintained in service, because of the fact that they were all made, as it were, "from one design." But the day when this boast could be sustained is now past. The American locomotive is no longer represented by a single type, nor do we object seriously to the new order of things, for new conditions have arisen, and the machine which appears in response thereto marks a new era in locomotive design.

A dozen years ago the life of the so-called American engine, as an exclusive type, had about run its course. Railroad building was at an end, business declined, and orders for new locomotives suddenly ceased. When locomotive building revived again, it was in response to a new demand—a demand for higher efficiency in the operation of trains. A decade has passed under the influence of these new conditions. A single architect in charge of the drawing room has now given way to well-equipped and well-organized engineering departments. Locomotive designing for specific service has ceased to be the exception, and has become the rule. Engines have been made heavier, types have multiplied, and accessory attachments performing various functions have greatly increased in number. This period has necessarily been one of change and experimentation, but the experiments have been so well guided that a high standard of success has been maintained. While the modern machine possesses many of the essential characteristics of the earlier engine, it has overstepped limitation, the recognition of which was once regarded as essential. The form of the engine has changed, the number of details has greatly multiplied, and there is little about it which suggests the old-time eight-wheel American-type.

What of the future? Shall we continue to build heavier engines? Is it likely that there will be a still further increase in the number of types, and in the number and complication of the accessory appliances now thought so necessary, or have we, as many well-informed engineers believe, already exceeded a safe limit in these respects?

Before attempting to discuss the characteristics of the future locomotive, I desire to call attention to a very general disposition to employ a false standard, in estimating the value of a proposed improvement in locomotive design. This false standard is based upon the idea of *complication*. Judged thereby, everything which is complicated is objectionable and bad. Arguments favoring the adoption of a particular detail, however sound in themselves, have often proved ineffective when opposed by the assertion that the detail in question was too complicated. This stigma has, in fact, had the effect of a death sentence rendered without trial.

All this is fallacious. The truth is that we do not really object to complication, but rather to things which are bad. A bad contrivance may be complicated, and may be objected to, and properly so, but we should not deceive ourselves as to the cause of its defects. A careful analysis will in most cases show that the real objection is not due to complication, but to the inherent badness of design, and this, it goes without saying, should always be condemned. I think it is not too much to say with reference to the details of locomotive design and construction, that increased complication in parts which are well conceived and well designed, cannot in any way impair the efficiency of the whole machine or increase its chance of becoming deranged. On the other hand, if, by increasing complication, a necessary function can be better performed, then it may often happen that danger of derangement is lessened and the action of the whole machine is actually improved. For example, the equipment of a business office, including the telegraph, telephone, typewriting machines, and filing cases, is now vastly more complicated than formerly, but this increased complication has not weakened the work of the office, nor increased the liability of its business to interruption. The complication in this case is of real advantage, for it has helped to increase the output of business. Similarly, in the domain of individual machines, the sulky plow is more complicated than the crooked stick of the Egyptian, the steam saw-mill than the whip-saw, and the ocean liner than the primitive raft or canoe. But in all these cases, the results sought are secured with greater certainty and with a higher degree of perfection, by the more complicated mechanisms. The fact is that all contrivances with which we deal are in process of change from simple to more complex forms. It is the law of progress, and there is no exemption for the locomotive. In its earlier forms its construction was simple and even crude. It has since been gathering to itself embellishments and refinements which, while they have added to its complication, have at the same time prepared it for a more exacting service. But the modern locomotive with all its merit is not yet perfected. It would be folly to suppose that the addition of a bell ringer or of a system of water pipes for cooling bearings, or that the substitution of nickel-steel axles for carbon-steel axles, is to be the last touch in the embellishment of such a machine. So long as designers can conceive of better results, just so long will they strive for changes and additions that such results may be secured. The machine of the future will be better designed than any of its predecessors, the material used in its construction will be more carefully chosen, it will have a greater number of accessories, and its whole organism will be more highly and even perhaps more delicately articulated, but it will not be less certain in its action. Some details now common will be eliminated because they are bad, and others, which perchance may be more complicated, will be added, because they are good.

Upon this point, however, I do not wish to be misunderstood. I have no argument in favor of complication for complication's sake. The argument is to the effect that a really good device is good notwithstanding the fact that it may be complicated.

With this understanding we may now consider the nature of some of the important details which the progress of the future is most likely to affect.

Certainly, one way in which the American locomotive is to be improved, concerns the methods employed in handling its fuel. A process which makes the operation of a 1,500—or 2,000—horse-power steam-plant depend upon the ability of a single man to feed its furnace, not only involves serious chances of failure, but holds the performance of the plant much below its possible capacity. Under present conditions when the modern engine has proved disappointing in its performance, the fault has not always or often been due to insufficiency of boiler or machinery, but rather to the fact that the fireman's muscle has not been equal to the service expected of it. I am convinced that there are many large engines in operation, the power of which could well be increased from 10 to 20 per cent. if they could be adequately fired.

Such a condition cannot long continue. The American designer is not likely to go on limiting the output of any class of machinery by the strength or endurance of a single man. There are even now promises of early relief along this line. In some portions of the country, oil is being extensively used as fuel. The use of pulverized coal has advocates whose theories are applicable to all parts of the country, and at least one form of mechanical stoker has been the subject of extensive experimentation. Which one of these plans is likely to come into most general use, or whether any one of them will long endure, I shall not attempt to predict. I only know that the demand for automatic stoking exists, and I feel confident that in some way it must soon be satisfied.

Another promising field, in the cultivation of which much progress has already been made, is that of compounding. As a general proposition, compound cylinders require less steam than simple cylinders for the development of a given amount of power. A saving in steam implies a reduction in the quantity of water to be handled, and, hence, compounding should prove advantageous in localities where water is scarce or bad. A saving in steam also implies a reduction in the amount of coal required to perform a given service, and, hence, compounding should be popular wherever fuel is expensive. A saving in the amount of steam used per horse-power per hour permits the development of greater cylinder power in connection with a boiler of given dimensions and weight, so that compounding becomes a means by which the limit of power may be raised when the weight of the locomotive as a whole has been fixed.

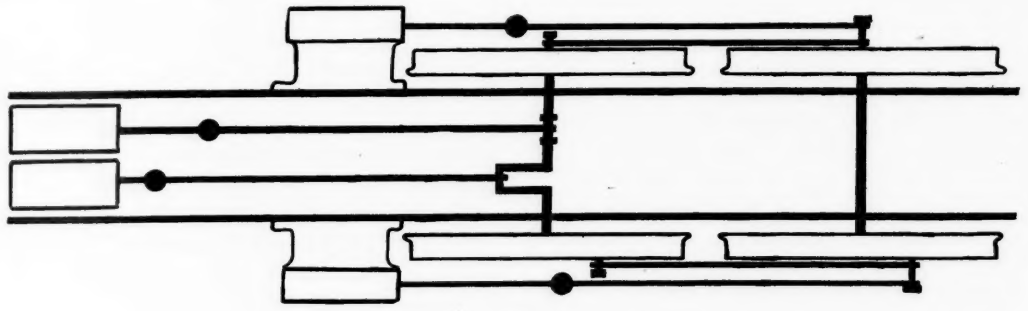


Fig. 1.—Possibilities in Locomotive Design.

These, of course, are general propositions. Local conditions, such as profile of line, or character of service, may introduce factors which operate either to emphasize or to diminish the force of the propositions already presented. Suffice it to say that the compound locomotive is a more highly specialized machine than a simple engine of corresponding power, and, hence, cannot with equal advantage be used in so great a variety of service, but even with this limitation, there are many conditions and many classes of service in this country for which the compound engine is well adapted. Assuming this to be true, all questions affecting the design of the compound features, and of the increased cost of repair resulting from the adoption of such features, are, after all, matters of detail. If there is advantage to be derived from the adoption of the compound principle, the time will come, if it has not already arrived, when the details will be had for making that principle generally available.

Another direction in which I look for improvement is in the matter of balancing the reciprocating parts of locomotives. Great progress has been made during the last 10 years in this respect. Drive-wheels have been made larger, reciprocating parts relatively lighter, and rules to be followed in determining the amount of counterbalance have been widely published and generally applied, but still it remains that the best that has been accomplished is a compromise. It is mechanically impossible to balance reciprocating parts perfectly by the use of revolving weights in the wheel. Counter-weights in the wheels can exert only a centrifugal force, the direction of which keeps pace with the revolutions of the wheel, and it is only the horizontal component of these centrifugal forces which can be utilized as a balance for the reciprocating parts. The vertical components of these forces are entirely unbalanced. When the counter-weights are below the center of the axle, they increase the pressure of the wheel upon the track, and when they are above the center of the axle, they diminish this pressure. These forces are maximum when acting in a vertical plane. They reverse their direction with each half-revolution of the wheel, or, in the case of an engine at speed, at intervals of about a tenth of a second, and their magnitude for each wheel equals many thousands of pounds. For example, in one of the engines exhibited at the recent convention in Saratoga, the reciprocating parts for each side weigh 1,532 lbs. These parts are balanced by

weights in four coupled-wheels. Assuming that the balancing is in accord with the Master Mechanics' rule, the vertical component of the excess balance would, at 60 miles an hour, equal 12,000 lbs.; that is, at one instant, 12,000 lbs. upward, and in a tenth of a second, 12,000 lbs. downward. This for one wheel. For the four wheels on one side which act in unison, the total effect amounts in round numbers to 50,000 lbs.; while the total variation in wheel pressure for each side of the engine is, for the speed named, substantially 100,000 lbs., or half the total weight of the machine. I mention these points not in any spirit of criticism, but simply to emphasize certain undesirable effects which are the outgrowth of our best practice. There can be no question that such variations in the pressure of the wheel upon the rail are undesirable, for it is apparent that to provide for them, more attention is required to maintain the track at a given standard than would otherwise be necessary. Moreover, it is undoubtedly true, that because of the counterbalance, standards of track maintenance are now accepted which are far below those which might be maintained if all locomotives were perfectly balanced.

Again the locomotive is a creature of the track. The better the track, the more refined can be its mechanism, and it is to the interest of the locomotive designer to encourage a high standard in track construction. It may be noted in this connection that as the standard of maintenance with respect to line and grade has been enhanced, old ideals demanding flexibility in track construction have disappeared. We have come to recognize the fact that when the form of the track can be perfectly maintained, then absolute rigidity is the desirable condition. I do not imagine that the foundation of first-class American track is always to be gravel or even broken-stone. A considerable amount of municipal track is already laid in concrete. When the present price of cement shall have been halved, and when the conditions of traffic upon trunk lines shall enforce the demand, it is not improbable that the response will come in the form of concrete ballasting. If, as I believe, such construction is desirable, then its advent will be hastened by a more perfect balancing of locomotive drive-wheels. The track is the bed, the locomotive and the cars are the moving parts of the great machine. If the functions of the bed could be limited to giving support and guidance to the moving parts, the problem of the track would be vastly simplified, and improvement in this line would very soon touch the problem of locomotive design.

If better practice in balancing is desirable, how shall it be accomplished? It has been demonstrated by one whose life and genius have been largely given to simplifying the problems of the railroad,† that any reciprocating engine, may, by an ingenious arrangement of weights and levers, be perfectly balanced.

It is well known, also, that a satisfactory balance can be had by the use of four cylinders arranged in two groups, the cranks of the two cylinders of each group being opposed to each other, and constituting a couple. The Shaw locomotive, developed in this vicinity in the early eighties, the Strong balanced-compound engine, which was tested a few years ago on the Purdue testing plant, and the more recent 20-thousandth engine of the Baldwin Locomotive Works designed for the Plant System, are all four-cylinder balanced engines, and their existence is proof that improvement can be made in balancing American locomotives.

Without any wish to undervalue these American designs, I shall best serve my purpose by giving some attention to the four-cylinder compound, which was originated by M. de Glehn, Director of the Societe Alsacienne de Constructions Mecaniques in 1885, the important features of which are shown by the outline sketch Fig. 1. In the de Glehn design, the two low-pressure cylinders of a four-cylinder compound are placed side by side between the frames, and connect with inside-cranks, which are set quartering on the forward driving-axle. The details of these cylinders and surrounding parts are similar in every respect to those of all inside-connected engines. Thus placed the low-pressure cylinders are well protected from radiation, and they connect with exhaust passages which are both short and direct. The high-pressure cylinders are placed outside the frame and connect with outside-cranks in the wheels of the second driving-axle. These cylinders are not in the same cross-section with the low-pressure cylinders, but are carried back on the frames a distance which is substantially equal to the spacing of the driving-axles, so that the main rod of the outside cylinder connecting with the second driving-axle is no longer than the main-rod of the inside-cylinder connecting with the first driving-axle. The side frames between the high-pressure cylinders are strengthened by substantial cross-bracing in the form of a casting, not shown in the sketch, which, so far as the frames are concerned, serves the purpose of a false saddle at this point.

The two or more pairs of driving wheels are connected by coupling rods, the several cranks being so arranged that the pins for the coupling rods in the front drivers are set diametrically opposite the inside cranks of the axles carried by these wheels. When one of the outside pistons moves forward, an inside piston moves backward, the reciprocating parts of each high-pressure cylinder being balanced by the reciprocating parts of its neighboring low-pressure cylinder. If, under these conditions, each wheel is perfectly balanced for its revolving parts, and if the reciprocating parts of the high-pressure engine have the same weight with those of the low-pressure engine, the machine as a whole will be balanced, both horizontally and vertically. So far as the action upon the track is concerned the balance will be practically perfect.

†Mr. M. N. Forney.

It will be seen that the machinery of these engines, as compared with that of an American two-cylinder engine, involves nearly double the number of parts. Thus, the French engine may have the same number of axles and wheels, but all other machine parts such as pistons, cross-heads, main rods, valve motions and valves are in duplicate. It is altogether likely that this brief description may suggest in the minds of many, a wilderness of complication, and to forestall unfavorable criticism, I would say that, if it were proper to do so, I could quote some eminent American locomotive designers who have seen these engines, who have ridden upon them and behind them, and who have been much impressed by their action. Moreover, there are now in service on the railroads of France more than 1,000 such engines, and at least three of the important lines of that country have accepted the type as standard for all new equipment. In view of the evident success of the French type, and of the needs of American practice, we may well consider the applicability of this principle to American practice.

It is urged first of all against the de Glehn compound that it does not constitute a very flexible type with reference to wheel arrangement, that while the details may be readily worked out for an American-type engine, or for an Atlantic 10-wheeler, it cannot readily be employed where there are more than two pairs of coupled wheels. The basis for this objection is to be found in the fact that the inside cylinders, with their guides and rods, are not easily manageable if there is a large number of driving-axles. This criticism has much force, but it must be admitted that an ingenious designer can do much in overcoming such difficulties. Moreover, even if it should prove that the type is not suitable for all wheel-arrangements, this fact is not to be regarded as an inherent objection to the type itself.

A second objection, often regarded as insurmountable by the American designer, is that the inside cylinders necessarily connect inside of the frames, and, hence, a crank-axle is necessary. When this objection is analyzed, it is found to be based in part upon the extra cost of a crank-axle, and in part upon experiences of long ago. Early American engines which were fitted with crank-axles, were very flexible and were frequently run over exceedingly rough track. The record shows that in such engines there were numerous failures of axles. We, therefore, said, and for years have continued to say, that we will not use the crank-axle. Our modern engine, however, is less flexible than the earlier one, and is less subject to strains through inequalities in the track. Our advantages in this respect are at least equal to those of other countries. If England and France can run crank-axles, why may we not do the same? The fact that these countries do use them, and meet with few failures, would indicate that the American objection is largely historic, and may not be well founded.

But the French compound presents another side to the axle question, too important to be overlooked. The problem of transmitting 1,500 or 2,000 horse-power through a single locomotive axle has in American practice led to the adoption of axles of very large diameter. In spite of this fact, axle failures on heavy engines are by no means unknown. With steam pressures and cylinder diameters still tending upwards, where is there sign of relief? Here, again, we can well afford to look with favor upon the French compound, for by its design the total power of the engine, instead of being transmitted through a single axle, as in American practice, is divided between two. The inside cylinders connect with the forward axle, and the outside cylinders with the rear axle. By the adoption of the de Glehn type, no single axle of our modern engines would be called upon to transmit as much as a thousand horse power, and present diameters could be materially reduced, and at the same time allow a wider margin of safety. The balanced-compound, therefore, instead of introducing axle troubles, may reasonably be expected to lead to a betterment in present conditions.

I desire to note in passing that neither the Strong balanced-compound, to which reference has been made, nor the balanced-compound of the Baldwin Locomotive Works, No. 20,000, nor the balanced-compound of the London & North Western of the Black Prince type, many of which are now in service, has had the advantage of this important feature of the de Glehn compound. Certain of these engines have been referred to as patterned after the French type, but in all of them both cylinders connect directly with the same axle.

Another important feature which is worthy of attention in any comparison between the French balanced-compound and the American type of engine, concerns the stresses upon frames. In the American engine that portion of the frame which lies between the cylinder and the main axle must resist all stresses set up by the action of the cylinders. Not only are the direct stresses heavy, but the eccentric loads due to the distance between center frame and center of crank-pin, are difficult to meet, and the failure of frames at or near the cylinders and at the main-axle pedestals, has led to the adoption of very heavy work in frame construction. In the French balanced-compound locomotive, the cylinders in the saddle represent but one-half the total power of the engine, and the stresses to be met by the frames at points near the saddle and at the pedestals about the axles are thereby reduced one-half. The second pair of cylinders is located further back upon the frames, and the stresses set up by their action involve only the rear portion of the frame and the pedestals about the second axle. Thus, it will be seen that the effect of the sub-division of power between cylinders thus arranged, is to distribute the working stresses of the engine throughout a greater portion of the total length of the frame, and to prevent that concentration of stress which in American engines has been met with much difficulty. It follows, therefore, that the frames of a French balanced-compound engine of the de Glehn type may be considerably lighter than the frames of an American simple engine of similar power.

As to the disadvantage which the de Glehn type presents because of the number of its cylinders, but little need be said. The American designer is already too thoroughly committed to the use of four cylinders to enter a valid protest. There are, moreover, good reasons why four cylinders should be used in a modern American compound locomotive. The two-cylinder compound was possible when locomotives were small; it is not possible as a general type at the present time. An attempt to reduce the number of cylinders to two, leads to such enormous cylinder volumes that room cannot be found in which to accommodate them. Moreover, American practice already includes many hundreds of Vauclain four-cylinder compounds as well as a goodly number of four-cylinder tandem compounds, all of which is evidence that we do not by our practice at least, object to the use of four cylinders.

Any discussion, therefore, growing out of the number of cylinders presented by the French type of balanced engine must concern not the cylinders themselves but rather the manner in which they are made to transmit their power to the axles. In American practice, we have generally sought to connect two pistons with a single cross-head from which a single main-rod leads on to the crank. In the French practice, each cylinder is treated as a complete unit having its individual cross-head and its individual main-rod. Comparing the two systems, the disadvantages of the French type lie wholly in the number of parts presented. There are four sets of cross-heads instead of two, as in American practice, and four main-rods instead of two. But these apparent disadvantages are more than compensated for by the increased lightness of the parts involved, and by the possibility of a higher character of design. In the American practice, the two main-rods of a modern engine must be designed so that each will transmit from 800 to 1,000 h.p. That this may be accomplished, rods have become enormously heavy and crank-pins have grown to be as large as axles were 10 years ago. Moreover, the forces to be transmitted often exceed the ability of the fixed portions of the machine to withstand properly, hence, parts strain, journals and brasses fit badly, and hot pins and boxes result. An American locomotive, if designed after the de Glehn type, would have four rods, each transmitting from 400 to 500 h.p., and the rods themselves would be light. The pins, while comparatively small, would afford liberal bearing surface without exceeding a convenient limit in size, and concentrated stresses upon all fixed parts would be reduced. In such a case, who shall say that the duplication of parts when off-set by such obvious advantages, increases the chances of failure? Is it not conceivable that under the conditions which have been described a larger number of parts may even involve fewer chances of failure?

Another terror which the French compound has presented to the American mind, is the duplication of valve gear. In the working out of this detail, the valves of the inside cylinders are generally run by means of link motion, and the valves of the cylinders outside by means of a radial motion. This arrangement provides for four eccentrics between the frames as in American practice, and also for the necessary link-work for the two radial motions outside of the frames. While this plan presents more complication than is common to American locomotives, each element entering into the whole arrangement is one of known character and is in itself simple. In mechanism the mistake is often made of avoiding duplication in parts, at the expense of roundabout connections, with an accompanying degree of dependency of one important element upon another, which is costly in maintenance and objectionable in principle. Thus, Mr. Webb in his balanced-compound of the Black Prince type uses a link motion to drive the valve of the inside cylinders. He carries the spindle of each valve thus driven, through the forward end of the valve box, from which, by means of a rocker, motion is transmitted across to the spindle of the outside valve. I assume that this arrangement works well, for the engines of the Black Prince type have given, and I understand are continuing to give, most excellent service, consequently my criticism of them is one of principle rather than of fact. Regarding the arrangement which has just been described as a piece of design, it is evident that any lost motion in the mechanism between the two valves would result in a less satisfactory distribution of steam for the outside cylinder, than that which is obtained for the inside cylinder. In other words, the valve which is nearest the axle is likely to get the better motion, and anything which interferes with the action of the first valve affects the second valve also. As a proposition in mechanism it is a mistake so to design two equally important elements that the action of one is dependent upon that of the other. While, therefore, by the means which I have described, one valve gear is made to serve two cylinders, I question whether the design is really more simple than would have been the case had the valve of each cylinder been provided with an individual gear.

The argument for independent valve gears should also

emphasize the fact that where four valve-gears are provided the parts are relatively light. Because of the greater division in the service performed, eccentrics, eccentric-blades, links, rockers, valve-spindles, and tumbling-shafts are all lighter in the de Glehn compound than are the same parts upon American engines of like power. Moreover, duplication of valve gear involves details which in themselves are easily maintained. They consist chiefly of rods and link work, and it may be accepted as a principle that parts of this description are less liable to derangement than other elements of mechanism.

I should note, also, in concluding this comparison, that I have not attempted to refer to all of the details of the French balanced-compound engine. My endeavor has been to deal only with those parts which are essential to the working out of the general principle involved. Neither have I attempted to applaud French practice at the expense of our own. That which we have, is the outgrowth of our individual historic development and that which they have is the outgrowth of their historic development. Conditions have been dissimilar and the development has been along somewhat different lines. But the practice of different nations is constantly finding increased areas of common ground, and those elements in the practice of each which are good, are likely at some time to appear in the practice of all. My purpose has been to find, and to emphasize those features of the de Glehn compound which seem to me good, and hence worthy our serious consideration.

In all of the foregoing, I have attempted, also, to show that the simplest machine is not always that which has the fewest parts. An excellent example of this is had in the case of certain marine engines. Both in merchant and in naval service, four-cylinder triple-expansion engines are now not uncommon. It is true that three cylinders would be sufficient to satisfy the thermodynamic conditions involved, but if only three cylinders are used, the volume required for the last expansion necessitates the use of a low-pressure cylinder of dimensions too great to be conveniently handled or operated. Under such conditions, two low-pressure cylinders, each having half the required volume, are employed, and, so far as I know, no one has ever attempted to argue that the addition of parts thus involved in any way increases the chances of derangement or delay. On the other hand, the whole effect of the sub-division is to give increased security against such delay. Is not the time at hand when improvement in this line will be made by a sub-division of some of the larger parts of the American locomotive? Believing such a change imminent, I have hopes that in securing the advantages of such a sub-division, the opportunity which presents itself, both for compounding and for perfect balancing, will not be allowed to pass unimproved.

I look forward, then, to the representative American locomotive of the future, as an engine capable of exerting even greater power than the modern engine. I predict that it will be automatically supplied with fuel; its thermodynamic performance will be made high through the adoption of compound cylinders, and its mechanical action perfect, through the balancing of its reciprocating parts. With such a locomotive and with a track which is in keeping with the improved action of the locomotive which is to run upon it, the present generation will not need to blush when called upon to give over its responsibilities to that which is to follow.

Accidents on Electric Railroads.*

The subject of this paper is at the present time very important. The author has had eight years' experience in the investigation of accidents in this State. In the year 1898 there were 1,174 miles of electric railroads in this State; 4,002 box, 3,408 open, 10 mail and 208 freight, express and service cars operated. In that year there were 74 persons killed and 541 injured. In 1901 there were 1,548 miles of road; 5,190 box, 3,945 open, 10 mail and 558 freight, express and service cars operated, and 160 persons were killed and 867 injured.

The death rate in reference to miles of road operated was .063 in 1898, .102 in 1899, .104 in 1900, and .103 in 1901. With the exception of the year 1901, in which year the death rate in proportion to miles of road was less than the year previous, there has been a continuous increase in the death rate as compared to the mileage.

These figures include the killed and injured from all classes of accidents; a large majority of them are the result of collisions, derailments and failures of bridges and trestles. I shall confine myself to this class of accidents. Accidents incidental to city operation will not be discussed. In the investigation of head and rear collisions motormen have two stereotyped excuses: first, "When I saw the car ahead of me I applied the brake, but it would not work;" second, "I then put on the reverse, but it would not take." The testimony taken in the investigation nine cases out of ten, goes to show that the motorman's statement was not true. . . . The statement can safely be made that in a large majority of accidents the primary cause can be traced to inefficient management of the road, and while the motorman may be the immediate cause of the accident, it in all probability would have been prevented had the management been more systematic.

There has been a large number of tail-end and head-on collisions. The larger portion of these have been caused by motormen running past switches where they were due to meet a car. Several have been caused by misunderstanding of train orders transmitted over a telephone system; several by conflicting orders being given by different officers of the company; some by crews attempting to "steal" a switch; several by crews taking it for granted that a car which was due at a junction of two lines had passed that point; others by the failure of block signal systems; a few by cars getting beyond the control of the motorman on heavy grades and not stopping at a switch where they should have stopped; a number by facing-point switches on cross-overs on double tracks, and there have been two cases where motormen have seen cars approaching them on the same track, and have continued at full speed, with the intention of making the other car back up to the switch, the speed being continued on both cars for the same purpose until it was impossible to stop either; two were caused by the running of special and work cars over a road without proper notice being given to the regular cars; one head-on collision was caused by an ordinary passenger car being used as a work car and not being placarded as such; a regular car met it on a switch where another regular car was due; supposing it was the regular car the crew ran out onto the main track, and the two regulars met in head-on collision. Among the causes of tail-end collisions may be mentioned the 500-ft. distance rule in use on a large number of suburban and interurban railroads; cars coming to a stop at points on the road where the view of an approaching car is limited; cars "running away" on grades and on wet and slippery tracks; regular cars running into work cars, standing upon the main track without protection; broken trolley wheels leaving a car standing on the track without lights; trains being run in sections without the rear end of the first section being properly protected.

The accidents at grade crossings of steam and electric railroads and at grade crossing of electric railroads, are invariably caused by violation of the rules, for I do not know of a crossing of steam and electric tracks in this State, where there is any considerable volume of traffic on the steam road, but what the company's rules require the electric car to come to a stop and the conductor to go ahead and flag his car over the crossing. But some collisions have been caused by the power giving out while the electric car was going over the steam tracks, or by the trolley leaving the wire while this was being done. At nearly every crossing of two electric tracks the cars on one of them are required by the rules to come to a full stop before proceeding over the crossing.

The causes of derailment are varied. Cars going around sharp curves at too high a rate of speed; the spreading of tracks on curves; irregularity and poor alignment of curves and lack of proper elevation; where the grooved rail is used, the groove being filled with stone, sand or other substances; frogs and switches not being properly placed; open switches; poor alignment and surface of track; broken flanges on wheels; axles out of line; loose wheels; wheels not properly gaged, etc. There have been several accidents resulting from bridge and trestle failures. These in most cases have been caused by leaving old structures in the road and increasing the weight of cars operated over them without increasing the strength of the structures. There have been two derailments on bridges, resulting in serious injury to passengers, brought about by the custom of planking highway and street bridges flush with the top of the rail, without proper guards to prevent a car from going off the rails and over the side of the bridge. This planking flush-with-the-top-of-the-rail is almost the universal custom and is a very dangerous one.

Up to this time the electric car has met with favor, preference being given to it, even when a destination could be reached quicker by the steam roads; but these frequent accidents are creating distrust. The confidence of the public must be restored, or you will not only drive people from the electric cars, but you will drive capital from investment in electric railways. These statements are intended to apply only to roads other than the distinctively city roads in the State. The city railroads are operated in a manner which reflects credit upon the management of them.

There are several which are operated under rules and regulations which compare favorably with steam railroad methods. On one of them there is a complete telegraph train despatching system in use; on another, a train despatching system, in which the orders are transmitted by telegraph and telephone; on several others there are train despatching systems, the orders being transmitted by telephone only.

A well-organized operating force on an electric railroad can be compared to the motor, pinion and gear wheel of an electric car, the president being the motor; the superintendent the pinion; and the heads of the different departments, including motormen and conductors, the different cogs on the gear wheel. Each member must be in perfect working order; any defect in one shows a defect in the whole. The president must not reach over beyond the pinion, the superintendent, in carrying out his ideas. . . . The superintendent should be a man of ample experience and capacity, qualified to take charge of the operation of the road in all its branches, carrying out the views and ideas of the president, but to all intents and purposes he should be the czar of everything pertaining to the direct operation of the system. The motormen and conductors, the gear of the combination, must mesh into the different apertures between the cogs of the pinion, if one of the cogs of the gear becomes rusted and will not readily absorb the lubrication, which in the case of the organization is represented by the book of rules and special instructions, it weakens the whole structure, and if not removed will cause a breakdown. When a cog becomes worn out it must be removed from the system. If a motorman becomes too large for his position, as in the case of the cog, he will not mesh into the aperture assigned to him, but will interfere with smooth running, and must be removed. The superintendent should not be burdened with additional duties, such as the supervision of construction of extensions, or the negotiation of stocks or bonds.

The Railroad Commissioners' recommendations have in most cases been received by the companies in a proper spirit, but sometimes they say: "We have operated that crossing for 10 years and never had an accident on it. Our men are all instructed to flag their cars over it, and it is impossible for an accident to occur at that point. These are all old men, all live here in the town, and most of them own their homes; they are a good, steady, industrious lot of men, and I know each of them personally." . . . On an inspection tour I visited a certain town about noon. I called up the superintendent by telephone and arranged to call on him after lunch. At that time I boarded a car, and on the way to his office we met another car on a switch. The conductor of that car entered the one in which I was the only passenger, and looking at me, and seeing no other person in the car, called out to the crew of the car: "Boys, be sure and flag the crossing, as there is a Railroad Commissioner in town this afternoon." From that remark I drew two conclusions; one, that it was not customary to flag the crossing; the other, that I did not look like a railroad commissioner.

A better class of motormen and conductors would be secured if more care was taken in investigating their past records and physical condition before employment. Proper printed blanks should be filled out by the applicant, giving all of the necessary information, etc., and a thorough physical examination. There should be a more thorough system of "breaking in." On a majority of the interurban roads a man, no matter what his previous occupation, is put on a car with an old motorman 10 days; then he makes one or two trips with the superintendent, inspector or master mechanic, after which he is reported qualified and is given charge of the front end of a car. It is inviting accident to place such a man in charge of an 18-ton or 20-ton car, loaded with 50 or 60 passengers, descending 5 per cent. grades with sharp curves.

Another matter of importance is discipline. The first step is the compiling and furnishing a complete set of rules. It is the custom to require motormen and conductors to learn the rules, but very few companies require these men to remember them. In investigations of accidents the usual answer is: "I knew them when I went to work for the company, but don't know as I could repeat them now." The discipline and efficiency of employees in the United States mail service is as near perfection as possible. In that service employees are required to pass an examination at stated intervals. Motormen and conductors should do likewise. An accident recently occurred on one of the roads in this State where 14 persons were killed and 60 injured. This accident might have been prevented had the conductor of the car used proper judgment and set the rear brake after the front one had become disabled by the breaking of a brake rod. When asked why he did not do this, he answered, "Because I did not receive four bells from the motorman." The rule should especially provide for the safety of trains when operated in more than one section. Usually the book prescribes a 500 ft. or 1,000 ft. spacing distance. This alone is not sufficient to insure safety where one car is following another, as in many cases the view is limited to less than this distance. The ideal method of operation on any suburban or interurban railroad is the running of cars under a telegraphic train despatching system. On most of the roads in this State this is impracticable, and the telephone is in a number of cases substituted for the telegraph, the motorman or conductors acting as operators. A reliable block signal system, the cost of which would place it within reach of electric railroads, is something which is much needed, and it would be an important factor in reducing accidents. There is no such system in extensive use on any of the railroads in this State. Several serious accidents having occurred through a misunderstanding of telephone orders some roads now have the motorman receive the order from the despatcher and write the body of the order on a printed blank; this is manifolded, a copy given to the conductor, who then repeats it back to the train despatcher, giving the name of the motorman and conductor, he receiving "complete" and time from the despatcher. Another important matter is a proper timetable. Some have said: "I consider that unnecessary, as in our regular operation we only run two cars." This is not a valid excuse for not having telephones and a timetable, for it takes only two cars to cause a collision. A collision recently occurred on a road four miles in length, where in regular service only three cars were operated. This collision resulted in the death of 14 persons and the injury of 60.

The question of derailment is one on which I would not occupy a great deal of time. Derailments are caused by defects in track or equipment, or by carelessness in the operation of cars. Defects in track are often not repaired on account of the financial condition of the company. One man said: "I know that that derailing

*Extracts from a paper by C. R. Barnes, Inspector for the State Railroad Commission; read before the New York State Street Railway Association, Sept. 9.

switch should be put in; I know that that track should be raised up; I know that this section should be ballasted, and I know that that curve is in bad condition, and I have asked our folks for the money to do this work. I am glad you have made the recommendation for it, as they think that we can get along without it for another year."

The Railroad Commissioners have made an examination of nearly every bridge and trestle in the State over which electric cars pass, and in case of apparent weakness, have made recommendations for the strengthening of the structure. . . . These recommendations have been generally complied with.

Brake equipment has been so thoroughly discussed that it is not necessary to do more than to say that, on suburban and interurban roads it is almost criminal carelessness to operate the class of cars which are usually operated on these roads with only a single chain hand brake on them. Most of these roads have grades running from 2 per cent. to 10 per cent., and in some cases more than that, with sharp curves at the foot of the grades. Cars on these roads should be equipped with the best braking appliance obtainable in addition to the ordinary hand brake, and in cases of extreme heavy grades and sharp curves, they should be equipped with additional emergency brakes, and all cars, both open and closed, should be equipped with a sand box on each end.

There are some roads on which the Railroad Commission is seldom called upon to investigate an accident. When we visit the manager's office of these roads we invariably find a business office, everything indicating that the man in charge is thoroughly posted. You will see on file one or more of the periodicals devoted to electric railway interests. The successful managers of electric railroads have been found in attendance at the street railroad conventions; the managers of the roads on which most of the accidents are occurring are rarely met at these conventions unless the convention happens to be held in a city near which he is located. . . . There should be a standard set of rules adopted by this convention immediately, and it should adopt a standard set of specifications for the construction of the various sizes of cars, all to be of uniform height of buffer and uniform construction for each size of car.

The disagreeable portion of this paper has been written. Let us now turn with satisfaction and pride to the operation of the city roads of this State. The everyday transactions of the Metropolitan Street Railroad, carrying the immense number of people which they daily do, with the small number killed and injured, is one illustration of the safety of operation of electric railroads. The comfort, convenience and safety with which the large crowds at the Pan-American Exposition were handled by the Buffalo Traction Company last year is another illustration of the careful operation of an electric railroad. The Brooklyn Heights Railroad carries the large crowds to and from the summer resorts on Long Island in comparative safety; very few persons are killed or injured, as compared with the number riding. There are summer resorts near Rochester, Syracuse, Utica, Albany, Binghamton, Elmira, Jamestown and Auburn, to and from which there is unusually heavy traffic during the summer season. These crowds are carried and managed in such a manner that it is very seldom that a person is killed through any defect in the method of operation or the equipment of these railroads.

Electric Express and Package Delivery.*

The establishment of the electric service is a boon to towns to which lines are being rapidly extended in all directions within a radius of from 75 to 100 miles, and in a great many cases reaching towns and villages which have never heretofore enjoyed a railroad connection, or at the best, in a roundabout way. Electric service has also made next-door neighbors of communities between which, before its establishment, even wagon communication was not satisfactory or feasible.

To the lay mind, the express and parcel business of the electric line or system would appear to be an additional and profitable use of the franchise, involving no additional expense beyond suitable rolling stock and the necessary train crew; but my experience has been that the operating expense tends to become greater than that of the passenger service, for the latter calls for no local stations or agents. . . . In addition to the foregoing handicap to a profitable operation of the express service, I find myself confronted, in Detroit, by an ordinance which prohibits the use of trailers, and worse still, which levies a tax of $1 per car per round trip, regardless of whether the car is empty or loaded. This tax is a radical departure from the good old days, when the town or its public-spirited citizens gladly raised a bonus to encourage a railroad connection and then considered themselves highly favored.

The management of a system should show a proper appreciation of the importance of the express department and its bearing on the continued and increasing prosperity of the system, in the building up of an interurban patronage, for it seems a necessary conclusion that the out-of-town dwellers will avail themselves of the mail order and telephone facilities of the large city stores because of the convenient and speedy electric express car delivery to their doors, and the habit once formed of sending their shipments or orders via the electric express car must eventually result in more frequent trips on passenger cars for personal and wider selections of their requirements.

But it must not be assumed that all branches of the system or even all towns and villages on a branch, warrant the establishment of an electric express service. The population, situation, products and future of each individual place and the competition of existing steam roads, if any; also the old-established express companies must be carefully weighed or that terrible ledger must be faced at the end of the year.

To secure and hold the favor of the public I have found it necessary to insist upon and maintain high-class service. . . . The best results can be only obtained by the employment of a traveling express agent, whose special duties should be the soliciting of business and the securing of routing orders from consignees on shippers, which routing orders are instructions to shippers to forward all shipments in connection with the electric express.

At Detroit the most important thing to contend with has been the expense of handling, which, prior to the consolidation of the electric lines, was cared for through three separate depots. For instance, express from the Rapid Railway system was handled through one depot; that from the Detroit & Pontiac, Detroit & Wyandotte, Detroit & Northwestern and the Detroit, Rochester, Romeo & Lake Orion roads through another depot, and that express for the Detroit, Ypsilanti, Ann Arbor & Jackson through yet another. This entailed an expense for each depot of an agent and staff, which till only recently has been changed and the stations consolidated in one large joint depot in close proximity to depots of steam roads and navigation companies, thus also decreasing cartage expense where interchange is necessary.

The building is 45 x 195 ft. On one side is the team track or driveway, where freight is received and delivered. On the east side of the shed there are double tracks with accommodations for four cars on each track, with ample room for switching. The interior of the shed is clear of all posts, thus giving ample floor space necessary for prompt receiving, sorting and loading the express and freight. There is also cold storage for the protection of perishable goods during the summer months. . . .

It may be asked to what class of freight or express should an electric service be confined? In this part of the country the electric express service may be said to have its origin in the transportation of milk, which was originally handled in the small compartment on passenger cars, reserved for baggage, but which has now grown to such proportions as to tax daily the capacity of entire cars. . . .

Tapping a great deal of territory that has hitherto had no railroad connection has necessarily thrust upon the electric express service at Detroit a class of freight that ought not to be carried in equipment of that character and which cannot be discriminated against, the rates charged being governed by railroad tariffs for similar class of freight are in some cases insufficient, and therefore unsatisfactory from the revenue standpoint. . . .

The rate on the different commodities handled are according to the value, dimensions and weight of each article. For example, shipments of glassware, furniture or any articles liable to damage from breakage are given a much higher rating than articles that are packed in such a manner as to occupy less space in the express car and which will weigh more than the articles first mentioned. . . .

The system for the express service on electric lines radiating from Detroit was adopted with a view to handling express and all accounts relating thereto in as simple, practical and systematic manner as possible.

Baggage is no longer carried in and out of Detroit on regular passenger cars, but follows on the next express car at a uniform rate of 25 cents per piece not exceeding 150 lbs. Where the actual weight exceeds the last-mentioned minimum, the first-class rate named in the express tariff is applied from and to the point to which baggage is going at actual weight. This arrangement was necessary on account of the additional expense involved in the handling of baggage and the low passenger rates in effect which would not allow of a free checking system.

It is still an open question whether compartment cars could not handle both baggage and passengers during certain light hours of the day, thus giving baggage early preference and more suitable care.

Under our present arrangement of checking baggage, a passenger can have his baggage checked from any point on our system at which we have agents, which arrangement, if the passenger is coming to Detroit, includes delivery to all hotels, steamboat landings, railroad depots and residences, is working out admirably in connection with the Detroit Omnibus Line Co. It might be added that this company (D. O. L. Co.) has representatives to meet all trains and boats, so that the passenger coming to Detroit can by turning over his checks to one of these representatives be relieved of all responsibility in connection with his baggage in case he desires to avail himself of the frequent electric service.

There is a future in the parcel feature of the business, if properly conducted, which problem we have not yet been able to solve to our satisfaction, owing in a measure to the peculiar conditions existing at this point. Under our present arrangement we are accepting parcels weighing from 1 to 50 lbs. for a minimum charge of 15 cents going to points within a radius of 40 miles, and a charge of 25 cents when going to points beyond 40 miles. This charge, it must be understood, is for the electric express service only, with a slight additional charge for cartage in case the consignee wishes package delivered.

DISCUSSION.

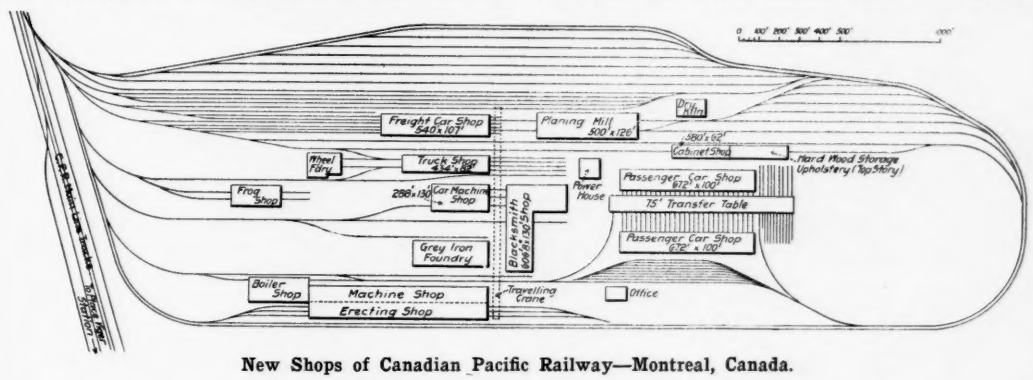
The discussion of this paper was brief. In reply to an inquiry from the President as to whether or not the original franchise contemplated the hauling of freight through the streets of Detroit, and if not what conditions the city imposed in granting the right, Mr. Parker said that the original franchise did not make such provision and an ordinance was passed granting the privilege. Also ordinances were passed prohibiting loading and unloading on the streets, which was not necessary by the building of a depot; also a tax of $1.00 a car per round trip was imposed whether the car was loaded or empty. Mr. Parker further stated in reply to questions that the express business caused an increased passenger business.

The President said that an express company doing business over the Metropolitan lines in New York simply paid for the privilege of using the tracks, furnishing its own equipment, etc. That this company has had up to the present 30 per cent. more business offered to it than it has had the facilities to take care of.

*Extracts from a paper by Mr. George W. Parker, presented at the Detroit Convention of the American Street Railway Association.

New Shops at Montreal.

The new shops of the Canadian Pacific Railway are to be built in the eastern part of Montreal adjacent to the Quebec line of the Canadian Pacific. The grounds cover about 350 acres, being about 4,500 ft. in length and 2,000 ft. wide. The purpose of these shops is the concentration of a large part of the repairing of the engines and passenger coaches used on the road, and at the same time making provision for the manufacture of locomotives, passenger and sleeping coaches and freight cars.



New Shops of Canadian Pacific Railway—Montreal, Canada.

The total floor space of the buildings planned for immediate construction and shown on the accompanying plans is about 750,000 sq. ft., or over 17 acres. The buildings will be of pressed brick on rubble stone and concrete foundations. The trusses will be combination trusses on steel columns for the shops of the car department, and steel trusses for the locomotive shops, the blacksmith shop and the foundry. The hot blast system of heating will be used throughout.

The passenger car shops, when completed, will be able to turn out 100 new cars a year, and repair 900 old ones. The freight car shop will have a capacity of 25 to 30 new cars a day, and will be able to repair 100 cars per day. The locomotive erecting and machine shops and the boiler shop will have a capacity of 75 new engines a year, and in addition will be able to repair 400 during the same period. The wheel foundry is designed to turn out 250 wheels per day.

The details of the power house and the power equipment have not yet been worked out, but electric transmission of power will be used throughout with individual machine and group motors in the several shops. The sizes of the buildings are as follows: Freight car shop, 540 ft. x 107 ft.; planing mill, 500 ft. x 127 ft.; cabinet shop, 290 ft. x 62 ft.; hardware storage and upholstering shop (two stories), 290 ft. x 62 ft.; passenger car paint shop, 672 ft. x 100 ft.; passenger car erecting shop, 672 ft. x 100 ft.; truck shop, 432 ft. x 82 ft.; car machine shop, 288 ft. x 130 ft.; blacksmith shop, 610 ft. x 130 ft.; grey iron foundry, 380 ft. x 125 ft.; machine and locomotive erecting shop, 900 ft. x 160 ft.; boiler shop, 300 ft. x 120 ft.; wheel foundry, 170 ft. x 110 ft.; frog shop, 250 ft. x 100 ft.; drying kiln, 250 ft. x 100 ft.; power house, 100 ft. x 120 ft.; office, 110 ft. x 60 ft., making a total of about 750,000 sq. ft., or over 17 acres.

The Memphis Shops of the Illinois Central.

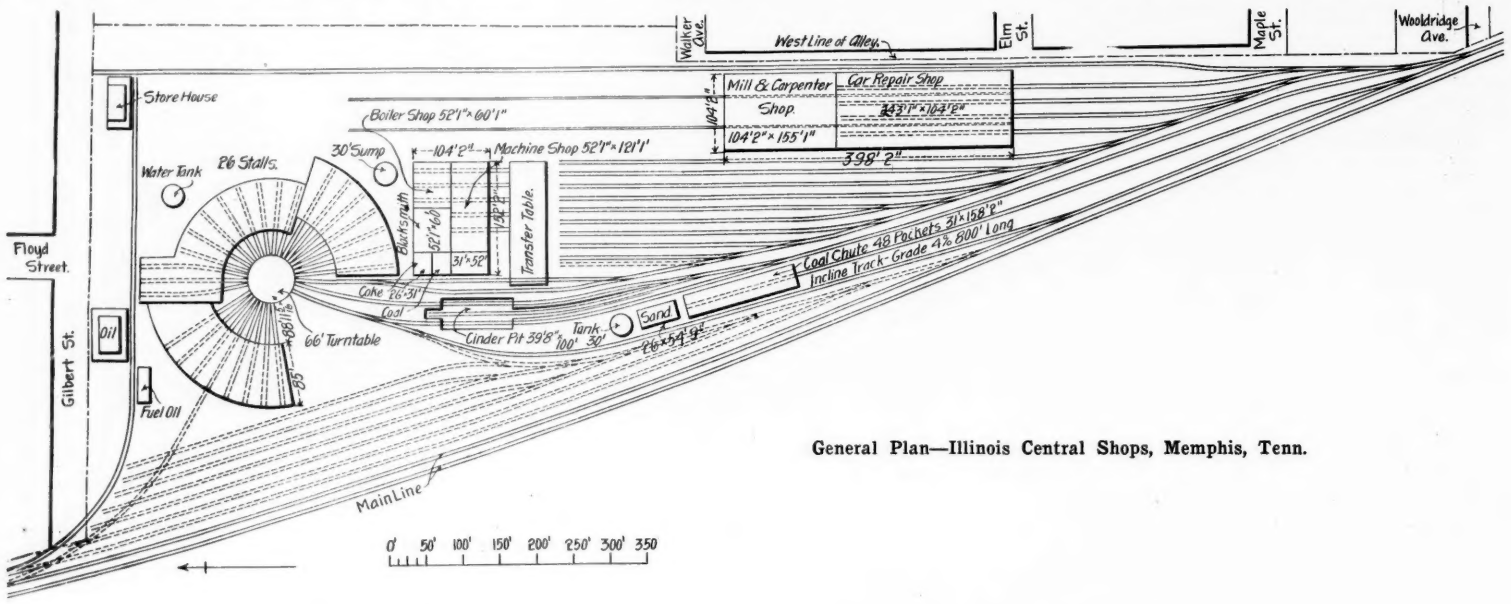
The shop improvements contemplated by the Illinois Central at Memphis, Tenn., have for their object the enlargement of the present terminal facilities for handling the large number of engines and cars at that division point. The road has good-sized shops at Paducah, Ky., and at Water Valley, Miss., points not a very great distance from Memphis either way. Memphis being a division point on the Fulton-Memphis-Grenada branch, and the northern terminus of the Yazoo & Mississippi Valley, something like 110 locomotives are required to be handled daily, as well as a considerable number of cars. As soon as the Yazoo City-Tutwiler-Lake Cormorant line, now building, is opened to traffic these numbers will probably be increased. The business has outgrown the facilities that have existed there for years. These latter consisted of a small engine house with machine annex, a coal chute, and several small frame buildings, more or less car repairing being done on uncovered repair tracks.

The old coal chute is to be torn down, as well as all other buildings except the engine house, which will have additions built on each side as shown in the general plan. A considerable tract of land was bought lying to the east of the original property, and as this is on the side of a bluff a large amount of excavating must be done in order to reduce it to a desirable level. The purchase of this tract and the excavating, which will amount to perhaps 150,000 cu. yds., will explain the large estimated cost of these improvements, $500,000.

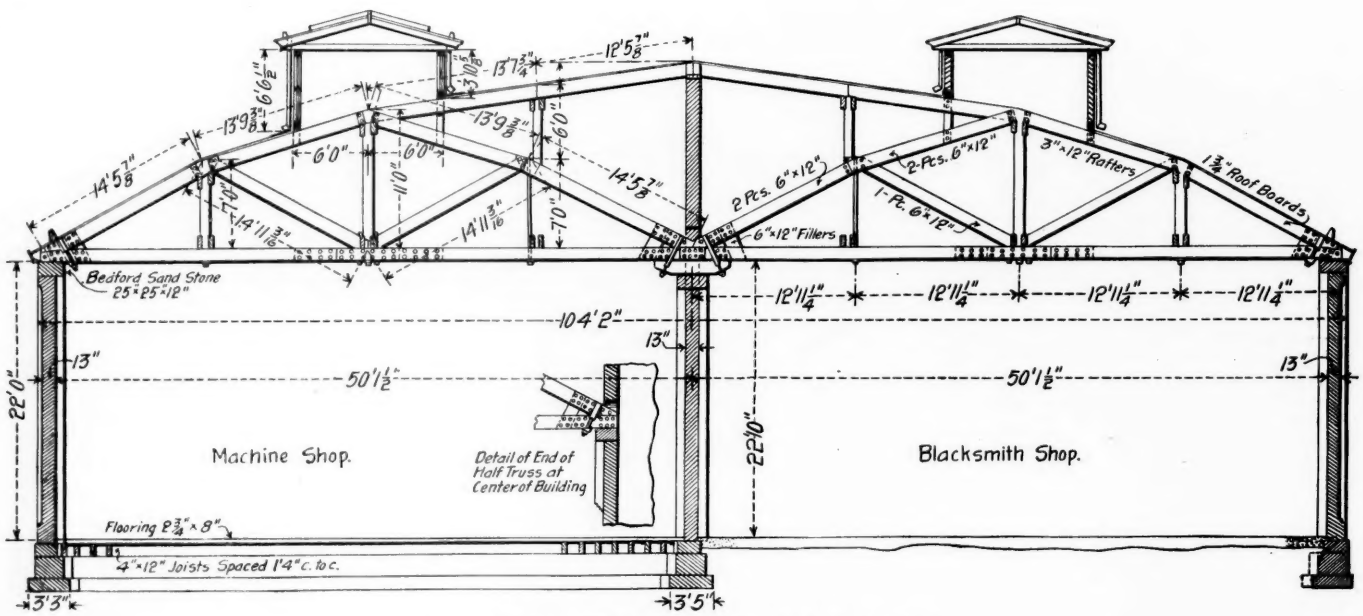
The plans for the new work include the additions to the engine house already mentioned; a car repair shop, 398 ft. x 104 ft.; a shop for locomotive repairs, 152 ft. x 104 ft., having the machine, boiler and blacksmith shops under one roof; a 48-pocket coal chute with accompanying sand and water facilities, and cinder pit, store house and oil houses; transfer table, and storage and switching tracks.

The contemplated trackage includes storage tracks for 354 cars, all of which will not be built at present. Those south of the transfer table will be put in at once, while those shown in broken lines west of the engine house will be added as required.

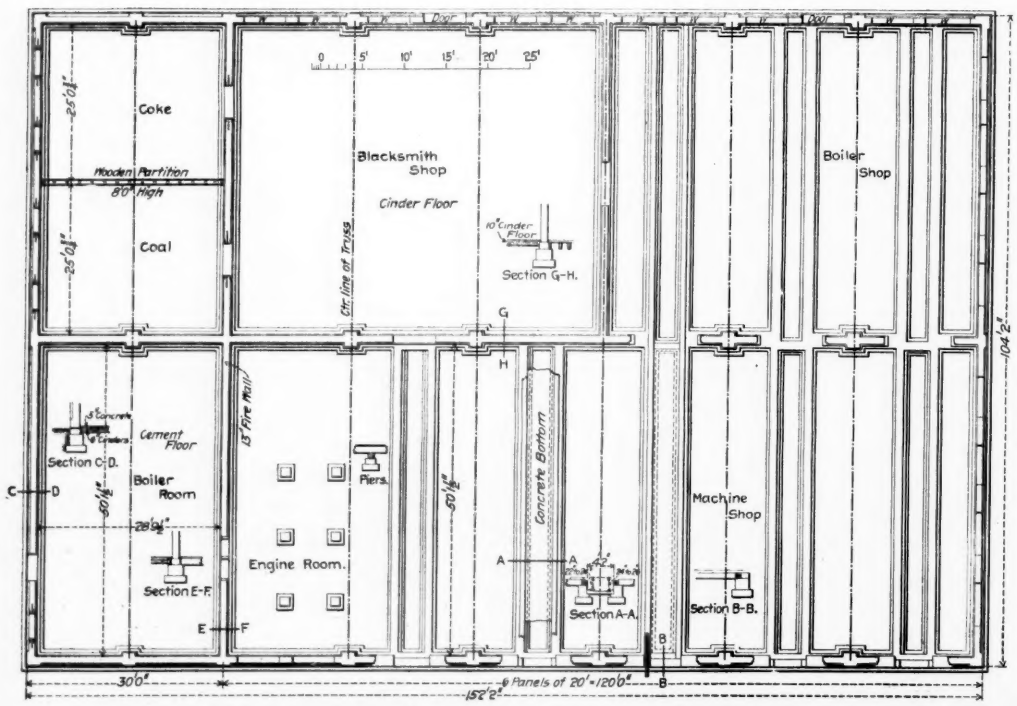
The larger part of the work done at this point will be repairs to cars, the relative size of the two shop buildings



General Plan—Illinois Central Shops, Memphis, Tenn.



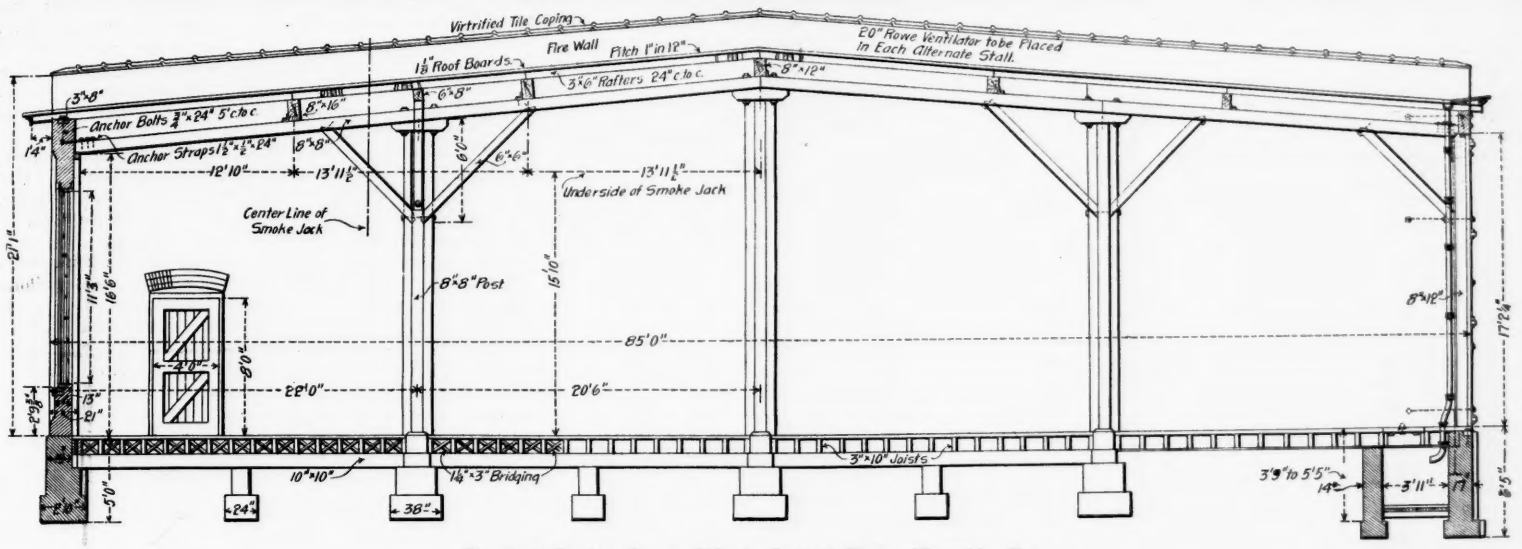
Locomotive Shop—Illinois Central Shops, Memphis, Tenn.



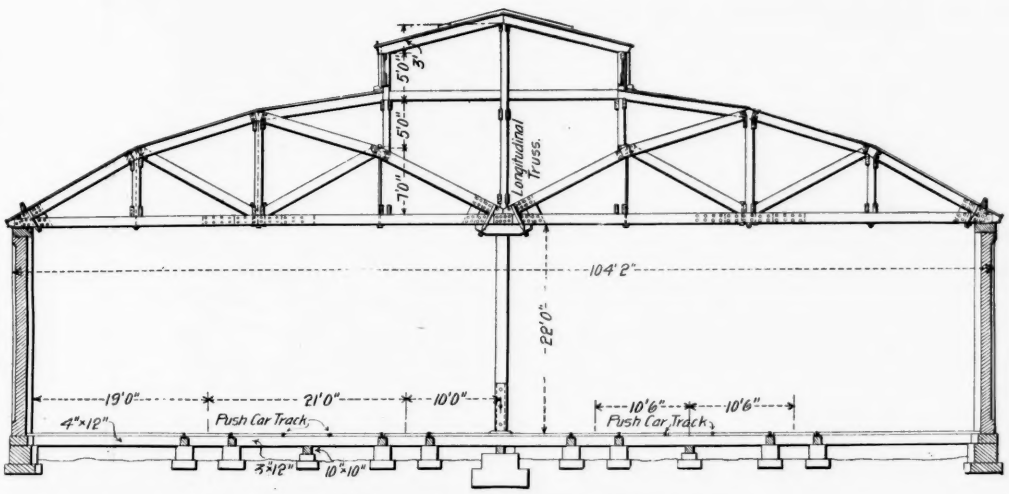
Plan of Locomotive Shop—Illinois Central Shops, Memphis, Tenn.

being an index. The car shop building is divided into two parts, one of which will be the mill and carpenter shop, and the other the car repair shop. This shop will have longitudinal tracks and a capacity for 28 cars. It will be of brick on concrete foundations, with timber roof trusses, the form of which is shown in the transverse section of the building. The width of the building is spanned by two 50-ft. trusses carried at the center by timber columns, and the outer ends resting on Bedford sand stone seats. A system of longitudinal trussing stiffens the lateral system at each vertical tie and at the center of the building, and also furnishes opportunity for swinging shafting when desirable. The car tracks rest on continuous walls of concrete of the form and dimensions shown. The flooring is wood, on 4 x 12-in. joists, and the roofing five-ply composition.

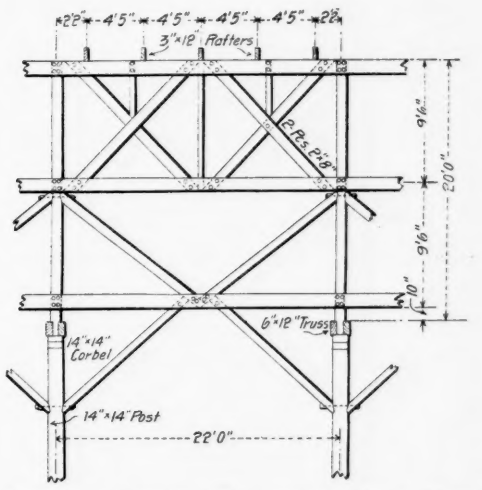
The locomotive shop is shown in plan and section. The construction is similar to the car shop with the exception that the trusses are carried at the center by a partition wall of brick, which runs up to the ridge of the roof, and there are two rows of ventilators instead of one. It is not expected to do any heavy repairing here, the machine shop having only five pits. A section of these pits is shown, the sides and bottom being concrete with a timber coping to carry the rail. The boiler shop pits are practically a continuation of the machine shop pits, there being a masonry partition between. The two shops are separated by the brick partition wall carrying the trusses, communication being had through large double doors placed at the ends of the pits. These doors, the openings of which are 17 x 11 ft., are made in halves which may be opened independently. The blacksmith shop adjoins the boiler shop and has at one end large bins for coke and coal.



Standard Engine House—Illinois Central Shops, Memphis, Tenn.



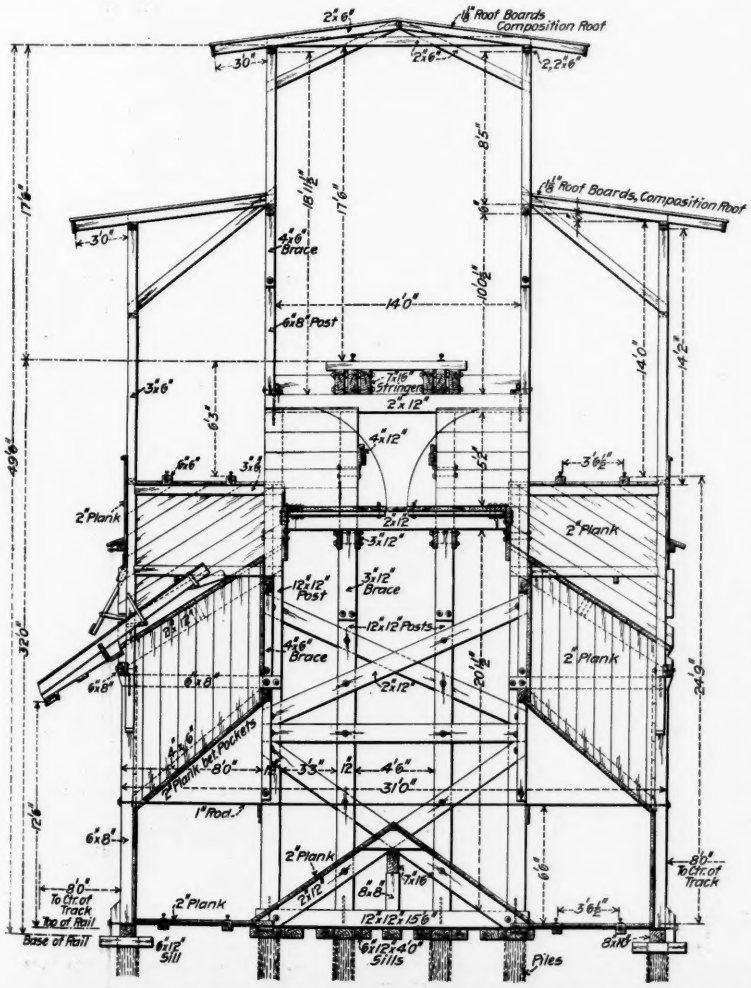
Car Shops—Illinois Central Shops, Memphis, Tenn.



Example of Longitudinal Trussing—Illinois Central Shops, Memphis, Tenn.

Power will be furnished from a steam plant under the same roof, the location of the boiler room and engine foundations being shown. The equipment for both the car and locomotive shops will be partly old and partly new; some new machine and wood working tools will be put in.

The additions to the engine house will give it 27 stalls. The new parts will be a greater distance from the turntable than the old house, to give standing room for engines between the house and table and also to permit the use of doors 13 ft. wide. The additions follow the standard of the road for 85 ft., 40-stall engine houses, a transverse section being shown. The walls are brick and the floor, posts and rafters are timber; the roof slopes both ways from the center.



Coal Chute—Illinois Central Shops, Memphis, Tenn.

The standard pits are 62 ft. long, with a 6-in. slope toward the back. The walls are concrete and the floor is wood over a cinder filling. The pits drain into a trench running around and inside of the back wall, in which are placed the steam and water pipes and also into which the down spouts on the back wall discharge. There will be two drop pits, one each for driving and truck wheels, the construction of which is similar to the standard pits. It is expected to use a hot-blast heating system for all the buildings.

The roof water from the car and locomotive shops and the coal chute will be led to a sump 30 ft. in diameter between the roundhouse and locomotive shop, to be used for feed water. Outside of this the water supply will, as at present, be obtained from the city mains, a storage tank back of the roundhouse being used as a distributing reservoir.

The coal chute will be the Illinois Central standard for its southern lines. The approach is an 800-ft. incline on a 4 per cent. grade, the delivery tracks being approximately 32 ft. above the ground. This plan provides storage facilities in connection with coal chutes, with means for handling the stored coal. The lower part of the structure is housed in, giving a large bin having inclined bottoms. If coal is delivered in side or center-dump cars it can be discharged directly into the storage bin through the trap doors below the delivery track, or if these doors be set at the proper angle the chutes may be filled. For handling the stored coal, tracks are placed on each side of the bin, on which are small bottom-dumping cars of 1½ tons capacity. An elevator on each track at the end of the building, operated by a long-stroke air cylinder, lifts these cars to the track above the chutes and into which they may readily be discharged.

The Pennsylvania Railroad in New York.

The franchise for the Pennsylvania's great line across New York City has again been approved by the Rapid Transit Commission, but it has not yet been passed by the Board of Aldermen. Mr. J. Edward Swanstrom, Borough President of Brooklyn, received on Oct. 10, from William H. Farley, Secretary of the United Board of Building Trades of New York and vicinity, a letter in which Mr. Farley said he had been instructed by the Board (a body composed of 35 unions, and representing 75,000 mechanics employed in building in New York City) to write to Mr. Swanstrom and request that the latter record his vote and influence against the franchise unless a clause was inserted providing for the payment of the prevailing rate of wages and an eight-hour clause to govern the time for work. Mr. Swanstrom has replied to the communication saying:

"I find myself unable to comply with your request.

"First, because I believe that the insertion of such a clause in the franchise would be unconstitutional in that it would restrict the free right of contract between employer and employee. The best legal minds agree that a clause of the character you specify cannot legally be made a condition of a grant of franchise, and I believe, therefore, that if I were to vote for such a provision my action in the premises would be mere demagogy.

"Secondly, because I am profoundly impressed with the conviction that the enactment of such a clause would be prejudicial to the best interests of workingmen, for the reason that it would result in the abandonment of an enterprise of great public importance and of the highest value to the city of New York. The Pennsylvania Railroad Company, if it secures the proposed franchise, will spend approximately the sum of $50,000,000 in constructing tunnels, terminal stations, etc. The benefit of this stupendous work will accrue to labor, a large part of the expenditure necessarily finding its way into the pock-

ets of the workingmen. The insertion of the provision would operate to discourage capital from entering upon enterprises of a similar character. Labor can be depended upon to take care of itself, as it always has shown itself abundantly able to do.

"Thirdly, because I believe that were I to comply with your request it would be against the best interests of my constituents, including thousands of workingmen in this borough. To reject this proposed great work would not only be a public calamity, but would inflict an irreparable wrong upon labor and its allied interests."

The Convention of the Street Railway Association.

The American Street Railway Association held its twenty-first annual meeting in Light Guard Armory, Detroit, Mich., Oct. 8, 9 and 10. It was considered one of the most successful conventions in point of attendance and exhibits in the history of the Association. Following its usual custom, Wednesday and Friday were devoted to routine convention work, Thursday being set apart as Exhibit Day.

President H. H. Vreeland, of the Metropolitan Street Railway Co., of New York, called the meeting to order and after the Mayor of Detroit had welcomed the Association, delivered his address, an abstract of which is printed in another column.

The papers read and discussed were as follows:

Registration of Transfers. By C. D. Meneely, Secretary and Treasurer Brooklyn Heights R. R.

Street Railway Mutual Benefit Association. By Oren Root, Jr., Assistant General Manager, Metropolitan Street Railway, New York.

Electric Express and Parcel Delivery. By Geo. W. Parker, General Express Agent of the Detroit United Ry.

The Steam Turbine; Its Commercial Aspect. By Edward H. Sniffen.

The Adjustment of Damage Claims. By Mason B. Starring, Assistant General Counsel, Chicago City Ry.

Signals for Urban and Interurban Railways. By Geo. W. Palmer, Jr., Electrical Engineer, Old Colony Street Ry., Boston, Mass.

Discipline of Employees by the Merit Systems. By W. A. Satterlee, General Superintendent Metropolitan Street Ry., Kansas City, Mo.

An abstract of the paper on Steam Turbines and of the discussion on it will be given in a later issue. The paper on Express and Parcel Delivery and the discussion appear, by abstract, in another column.

DISCIPLINE BY THE "MERIT SYSTEM."

This is the title of a paper which was read by Mr. W. A. Satterlee, of the Metropolitan Street Railway of Kansas City. Mr. Satterlee regards the introduction of Brown's Discipline as one of the most important improvements which has been made in street railroad operations. His paper consists principally of an account of the method of administering the system on his own road. At the places where employees report for duty a printed list is posted, showing how many demerits will be recorded for specific offences, as for example: Smoking on duty, 30; profanity on duty, 5; following car in front too close, 10; skinning the cable, 25; not answering signals promptly, 1; garnishee, first time 10, second time 10 to 50, third time 50 to 100; criticizing management of road in presence of passengers, 3; running without sand in sandbox, 3. There is also a schedule of merits: Politeness noticed by inspectors, 3; good stop in avoiding accident, 5; complete and perfect accident reports, 2; informing company of matters in the interest of good service, 3 to 10, etc. When merits or demerits are recorded a written notice is sent to the individual and a similar notice, without the man's name, is posted. Whenever a man's demerits exceed his merits by 100 he is liable to discharge.

SIGNALS FOR URBAN AND INTERURBAN RAILROADS.

This was a paper by G. W. Palmer, Jr., of the Old Colony Street Railroad (Massachusetts). Mr. Palmer pointed out the need of thoroughly efficient block signals on electric roads and indicated some of the deficiencies of incandescent lamp signals and other devices which are now in use. He said that on the Old Colony there are certain single track block sections which are operated by the staff system or, as termed by him, the "red stick." He says little about its working, however, except to mention the inadequacy of the staff system alone, when it is desired to start a car from the end of the block section remote from the stick. It effectually prevents the bunching of cars at one end of the line. Mr. Palmer says that the simple precaution of a red tail light has not been universally adopted on electric roads.

The discussion on this paper brought out numerous bits of testimony confirming Mr. Palmer's statements. As lightning frequently burns out lamps on the trolley line, any system depending on the main line current must be unreliable. The President stated that during the past two years he had been asked to investigate the physical and operating conditions on three different electric roads and in each case he found cars being operated under conditions that were long since out of date on steam railroads. Among other things, he recommended the adoption of a proper signal system and in each case the recommendation was disregarded. After each road had suffered accidents from rear-end collisions, causing damages exceeding $10,000 in each case, signals were adopted. There is no more important question confronting operators of high-speed electric roads than that of proper methods of car despatching and protection of cars. There is no collision in the transportation world that can compare in its dire results with a collision between electric cars. In studying signals with a view to the adoption of a system, the experience of steam roads is before the electric railways and steam railroad signals have been developed scientifically through years of trial. One member stated that telephone despatching, at present in use on his road, was to be displaced by the telegraph, and the Standard Rules governing train orders, and also as to lights and signals, fusees, rear lights, etc., were to be adopted.

REGISTRATION OF TRANSFERS.

This paper, by C. D. Meneely, of the Brooklyn Heights (New York) road discusses the question whether a conductor should "ring up" on his register the transfers which he receives. It is claimed by some that it is better not to register transfers, for in that way the transfer is divested of its cash value; but Mr. Meneely advocates the registration, on a single register, of everything that the conductor takes in. On his road transfers are issued not by the conductors but by transfer agents, at all points where cars from the same depot intersect and transfer. Thus dishonest conductors cannot treat directly with each other, but must have an intermediary. By this system, together with uniformed register inspectors between all principal terminal points and the first transfer intersection the revenue is practically protected between the outer transfer and terminal points. His road was the first to adopt the use of a transfer ticket printed specially for each day, with the date in large figures. Mr. Meneely regrets than on account of the lottery law and the probable injurious effect on public morals, it is impracticable to protect street railroads by offering prizes to passengers. He describes a simple plan by which a conductor could give a receipt to every passenger and the company could offer large cash prizes to be paid monthly on receipts held by passengers, the prize numbers to be drawn by lot. This could be done by the expenditure of a small fraction of the amount which is now diverted from the companies' revenue by conductors. This protective scheme, however, is not favored by street railroad lawyers and so "As long as street railways continue to operate there will be more or less dishonesty on the part of conductors, which no mechanical appliances can wholly prevent. The careful choosing of material; fair and considerate treatment and the encouragement of a spirit of honesty and integrity will always be the best safeguards for the protection of revenue. At the same time the study of improved methods of protecting the revenue by mechanical or other means should not be neglected, for many men remain honest only because of the fear of detection, and to such it should be our object to minimize the opportunity by all means in our power."

ADJUSTMENT OF DAMAGE CLAIMS.

On this subject Mr. M. B. Starring, of the Chicago Street Railway, gave an interesting address filled with the experiences of an adjuster in Chicago, where there are large numbers of drummers following every person who is injured or is supposed to have been injured, in a street railroad accident. These drummers are so industrious that the taxpayers are being asked to increase the number of judges on the bench in order to get damage cases tried within a reasonable time. Chicago is not of course, the only city thus suffering. Mr. Starring says that the introduction of the Roentgen ray machine has greatly helped the street railroad companies by detecting fraudulent claims for broken bones. If a similar detective of fictitious injuries to nerves and muscles could be invented the task of the adjuster would be greatly lightened. The author thinks it is rarely expedient to introduce evidence of intoxication against a plaintiff, and it is a delicate matter to annoy him in any way. Rarely should an injured person's attending physician, if honorable and a fair practitioner, be ousted from the care of his patient, for there will always be someone to claim that the company's physician has been sent to the bedside of the patient to injure him. In settling out of court with ignorant people try, if possible, to have them give a receipt in their own words. Never allow a person who has been drinking to sign a release. The most dreaded cases encountered by an adjuster are those which bring to bear the subtle influence of "pull." Not infrequently a conscientious adjuster finds that this influence has reached "above his head," and that the discharge of his duty brings him into opposition with others more easily influenced and of high rank on the company's roster. Corporate officers are not unmindful of the public attitude of sensitiveness and quasi-hostility towards them, and are, therefore, willing to make a just and liberal settlement without any undue influence exerted upon them, and for that reason adjust rather than contest even doubtfully meritorious claims. It is a good rule for any company to adopt to reverse rarely, if ever, a decision of its adjuster. If upon consultation with an adjuster it would seem that on the merits of the case in question some action different from that already taken by him should be had, let the adjuster attend to that in his own way; do not have him feel disgruntled and overridden. Many a good man has been spoiled by the unfortunate proclivity on the part of his managers to yield to the so-called "pull." If a company has any friends to make or debts to pay let them be paid through some other department and in some other manner. There is in every community a class of people which seeks its livelihood by preying upon both sides of personal injury claims. It seeks the individual and impresses upon him how much can be obtained through the go-between, and how little without such influence, embellishing the yarn with wonderful stories concerning that influence. There is one claim department of which I know into which such an individual is not allowed to enter. Many such a creature masquerades in petticoats. A word upon the litigation of damage claims. If a company employs only the ablest counsel obtainable, prosecuting its every defense vigorously and uprightly, 90 per cent. of the bar will seek settlements in terms not unfavorable to that company rather than meet it in court. Never compromise the verdicts when results are unfavorable. If they ripen into judgments make the best you can of them after they have been affirmed by a court of last resort, not before. Never settle "behind the back" of a reputable lawyer. If in rare instances circumstances compel such action, see that he receives a reasonable fee. On the other hand, never settle with the "ambulance chaser;" it is far better to pay the client of such an one $100 than to pay him $10. Avoid a reputation for settling everything; it hurts stockholders' pockets; equally avoid a reputation for fighting, but when you do fight win; settle all the grave cases that presage loss; litigate all those that possess little or no merit. It is a juster as well as a wiser policy—for once, at least, Justice and Expediency run hand in hand.

The officers elected were: President, J. C. Hutchins of Detroit; First Vice-President, W. Caryl Ely, of Buffalo; Second Vice-President, W. K. Schoepf, of Cincinnati; Third Vice-President, P. S. Arkwright, of Atlanta; Secretary and Treasurer, T. C. Penington, of Chicago. The Executive Committee consists of the officers and H. H. Vreeland, of New York; R. T. Laffin, of Worcester; A. Radel, of Bridgeport; W. H. Read, of Salt Lake City, and W. J. Hield, of Minneapolis.

A partial list of exhibitors is below.

EXHIBITORS AT DETROIT.

Adams & Westlake Co., Chicago, Ill.
American Brake Shoe & Foundry Co., Mahawa, N. J.
American Car Seat Co., Brooklyn, N. Y.
American Machinery Co., Grand Rapids, Mich.
American Railway Supply Co., New York.
American Steel & Wire Co., Chicago, Ill.
Atlas Railway Supply Co., Chicago, Ill.
Allen & Morrison Brake Shoe & Manufacturing Co., Chicago, Ill.
Baldwin Locomotive Works.
Brill, J. G. Co., Philadelphia, Pa.
Brown, Harold P., New York.
Christensen Engineering Co., Milwaukee, Wis.
Consolidated Car Heating Co., Albany, N. Y.
Continuous Rail Joint Co. of America, Newark, N. J.
Crane Co., Chicago, Ill.
Curtain Supply Co., Chicago, Ill.
Dearborn Drug & Chemical Works, Chicago, Ill.
Duff Manufacturing Co., Pittsburgh, Pa.
General Electric Co., Schenectady, N. Y.
Gold Street Car Heating Co., New York, N. Y.
Gould Storage Battery Co., New York, N. Y.
Griffin Wheel Co., Chicago, Ill.
Hale & Kilburn Manufacturing Co., Philadelphia, Pa.
Heywood Bros. & Wakefield Co., Wakefield, Mass.
Jewett Car Co., Newark, O.
Johns-Manville Co., H. W., New York.
Kalamazoo Railway Supply Co.
Kinnear Manufacturing Co., Columbus, O.
Lumen Bearing Co., Buffalo, N. Y.
McGuire Manufacturing Co., Chicago.
McLaughlin Car Coupler Co., Philadelphia, Pa.
Merritt & Co., Philadelphia, Pa.
National Lock Washer Co., Newark, N. J.
Northern Electric Manufacturing Co., Madison, Wis.
Nuttall Co., R. D., Pittsburgh, Pa.
Nernst Lamp Co., Pittsburgh, Pa.
Pantasote Co., New York, N. Y.
Pennsylvania Steel Co., Philadelphia, Pa.
Peckham Truck Co., New York.
Sherwin-Williams Co., Cleveland, O.
Standard Traction Brake Co., New York, N. Y.
Standard Underground Conduit Co.
Standard Varnish Works, New York, N. Y.
Stanley Electric Manufacturing Co., Pittsfield, Mass.
Stephenson Co., John, Cleveland, O.
Scaritt Car Seat Works, St. Louis, Mo.
Springfield Manufacturing Co., Bridgeport, Conn.
Standard Pole & Tie Co., The, New York, N. Y.
Standard Paint Co., New York, N. Y.
Taylor Electric Truck Co., Troy, N. Y.
Union Switch & Signal Co., Pittsburgh, Pa.
Weber Railway Joint Manufacturing Co., New York.
Westinghouse Electric & Manufacturing Co., Pittsburgh, Pa.
Westinghouse Air Brake Co., Pittsburgh, Pa.
Wharton, Jr., & Co., Wm., Philadelphia, Pa.
Wheel Truing Brake Shoe Co., Detroit, Mich.

The Operators' Proposition for the Settlement of the Strike.

On Tuesday morning there appeared in the newspapers a statement and proposition for the settlement of the strike, signed by the representatives of the coal mining companies and carriers. This is distributed in full throughout the land by the daily newspapers; therefore, it is not necessary for us to print it all. We do print, however, a few sentences in order that the reader may see clearly that the operators have not receded from the position which they have always held. That is, they are and have been, willing to consider carefully questions arising between themselves and their own workmen. They are not willing to treat with the United Mine Workers' Union as representing their own workmen, nor will they permit, if they can help it, the Union Mine Workers' to keep independent men from working. Extracts from the statement and proposition follow:

"There are in the anthracite regions about seventy-five operating companies and firms, and 147,000 miners and workmen (of whom 30,000 are under age), comprising some twenty nationalities and dialects.

"Of these workmen, possibly one-half belong to the United Mine Workers' Union. That organization was originally formed in the bituminous coal regions, and three-fourths of its members are miners of bituminous coal, and bituminous coal is sold in competition with anthracite coal. The remaining workmen in the anthracite fields either belong to no union whatever or do not belong to the Miners' Union.

"The present strike was declared by the Mine Workers' Union on the 10th day of May, 1902. Since that time many workmen not belonging to or not willing to follow that organization have been working in and about the mines.

"From 17,000 to 20,000 are now at work. Many more

have wished to work, but have been prevented by a course of violence and intimidation toward those working and toward their families, accompanied by the destruction of properties and the fear of death or bodily harm to every man who wishes to exercise his right to work.

"Violence has continued steadily and steadily increased, and it is clear that the rights of the other workmen cannot be protected under the supremacy of the Mine Workers' Union.

"The undersigned are not, and never have been, unwilling to submit all questions between them and their workmen to any fair tribunal for decision. They are not willing to enter into arbitration with the Mine Workers' Union, an organization chiefly composed of men in a rival and competitive interest, and they are not willing to make any agreement which will not secure to men now working, and all now or hereafter wishing to work, whether they belong to the Mine Workers' Union or not, the right and opportunity to work in safety and without personal insult or bodily harm to themselves or their families. For these reasons the arbitrations heretofore proposed have been declined.

"It will be remembered that at the conference in Washington, Oct. 3, we made the following offer:

"That we would take up at each colliery any alleged grievance and consider it fairly and adjust it if it proved to be a grievance, and in the event of a failure to make a satisfactory adjustment the questions at issue to be submitted to the final decision of the Judge of the Court of Common Pleas of the district in which the colliery is located.

"This offer was made by us in good faith, and we desire here to reaffirm it.

"The coal companies are not discriminating against the United Mine Workers, but they insist that the Miners' Union shall not discriminate against or refuse to work with non-union men; that there shall be no restriction or deterioration in quantity or quality of work, and that, owing to the varying physical conditions in the anthracite mines, each colliery is a problem by itself.

"We suggest a commission be appointed by the President of the United States (if he is willing to perform that public service), to whom shall be referred all questions at issue between the respective companies and their own employees, whether they belong to a union or not, and the decision of that commission shall be accepted by us.

"The commission to be constituted as follows:

"1. An officer in the Engineer Corps of either the military or naval service of the United States.

"2. An expert mining engineer, experienced in the mining of coal and other minerals, and not in any way connected with coal mining properties, either anthracite or bituminous.

"3. One of the Judges of the United States Courts of the Eastern District of Pennsylvania.

"4. A man of prominence, eminent as a sociologist.

"5. A man who, by active participation in mining and selling coal, is familiar with the physical and commercial features of the business.

"It being the understanding that immediately upon the constitution of such commission, in order that idleness and non-production may cease instantly, the miners will return to work and cease all interference with and persecution of any non-union men who are working or shall hereafter work. The findings of this commission shall fix the date when the same shall be effective and shall govern the conditions of employment between the respective companies and their own employees for a term of at least three years."

This document was signed by Messrs. George F. Baer, E. B. Thomas, W. H. Truesdale, T. P. Fowler, R. M. Olyphant and Alfred Walter.

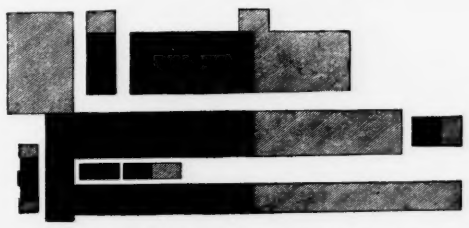
The New Works of the B. F. Sturtevant Co.

The new works of the B. F. Sturtevant Co. now nearing completion at Hyde Park, Mass., present an opportunity to study the factors that control in the location and design of the modern manufacturing plant. Aside from the general character of the lot itself the principal factors considered in reaching a decision were proximately to raw materials, and to an abundance of skilled labor, adequate shipping facilities, ample water supply, and space for ready disposal of waste material. The advantages of the West as against the East were carefully weighed, but the company expressed its faith in the prosperity of New England, in the facilities which it presents for work of the character conducted by this company, and in the quality of its skilled labor as an offset to present somewhat higher rates for raw material. The best combination of advantages was found in a lot of nearly 20 acres in the town of Hyde Park, Mass. Here is a population of skilled workmen which can be supplemented by present employees of the company, the new location being only six miles from the old plant. The lot selected has a frontage of about 1,300 ft. on the freight yard of the New York, New Haven & Hartford at Readville station, the distributing point for all freight passing over either the Midland or Providence divisions of the road.

The plans started with the idea of providing a total floor space slightly more than double that of the present plant. The lay of the land and its area were against a group of one-story buildings, and it was believed that the fixed charges on elevating machinery would be more than offset by a reduction in the horizontal distances necessary to be traversed.

The arrangement of the buildings was determined by the provision to be made for growth. One arrangement of a series of parallel buildings permitted increase only by multiplication of buildings, but provided an excellent opportunity for the carrying of switch tracks across both ends of each building. The other arrangement provided for a group of buildings parallel to the railroad tracks with accommodation for switch tracks between the buildings, and for their entrance at the ends of the building with an opportunity for growth by extension in length. After a careful working out of many schemes and a comparison of the advantages and disadvantages the latter arrangement was adopted. The small plan herewith shows by the shaded portions the opportunity for increase of size in each of the buildings.

The latest development of all-steel and concrete construction with large window areas did not appear to meet the requirements of a group of buildings as permanent and substantial in their character as these. All-steel buildings with brick walls and concrete fire-proof floors presented disadvantages in the way of discomfort to the workmen, inconvenience in attaching machines on hangers, and excessive expense which did not appear to be offset by advantages to be secured in the way of absolutely fire-proof construction. The type finally selected is composite in its character, consisting



Possible Additions Are Shown by Shaded Areas.

New Plant of the B. F. Sturtevant Co., Hyde Park, Mass.

of steel interior columns and main steel girders, with heavy brick walls, wood timbered floor and plank roofs. In the case of the one-story foundry, the roof is supported by steel trusses; in the other buildings open timbering with wooden columns in the upper floor is employed. The main floor in the machine shop is of tar concrete with spruce and maple flooring. The upper floors are carried upon wooden beams spanning the spaces between the steel girders, 20 ft. on centers. All roofs are of 3 in. plank with tar and gravel top.

The question of power was early decided to the extent that the entire plant would be electrically driven from a central power house; that the engines would run condensing, that the exhaust steam derived from engines under test which is considerable would be utilized for heating with supplementary amount of live steam admitted at reduced pressure as might be required.

The plan of this plant shows that consideration has been given to the transfer of materials through the various buildings to the point of storage or shipment.

The pattern building provides at one end a two-story portion 80 ft. sq. for carpenters and flask makers on the first floor, and for pattern makers upon the second floor. The rest of the building, which is devoted to pattern storage, is provided with intermediate floors, making four in all separated from the other portion of the building by double fire walls and automatic fire-closing doors. The close proximity of this building to the foundry facilitates rapid intercourse.

The foundry, 170 x 350 ft., is designed with the idea of distributing iron upon a track system, and is to be equipped with narrow gage railroads bedded in concrete making runways between the moulding floors. Two craneways run lengthwise through the building the greater part of its length, and the tracks extend beneath the crosswise traveling crane in the cleaning room at the end of the building. The brass foundry is in one corner, a wash room in the adjacent corner, a core room between the two; the latter has ample opportunity for extension towards the center of the building, while the foundry itself can be extended to practically double its length. Storage for supplies is provided upon one side adjacent to the railroad switch. From the bins thus provided, the iron and fuel charges will be carried directly to the charging floor.

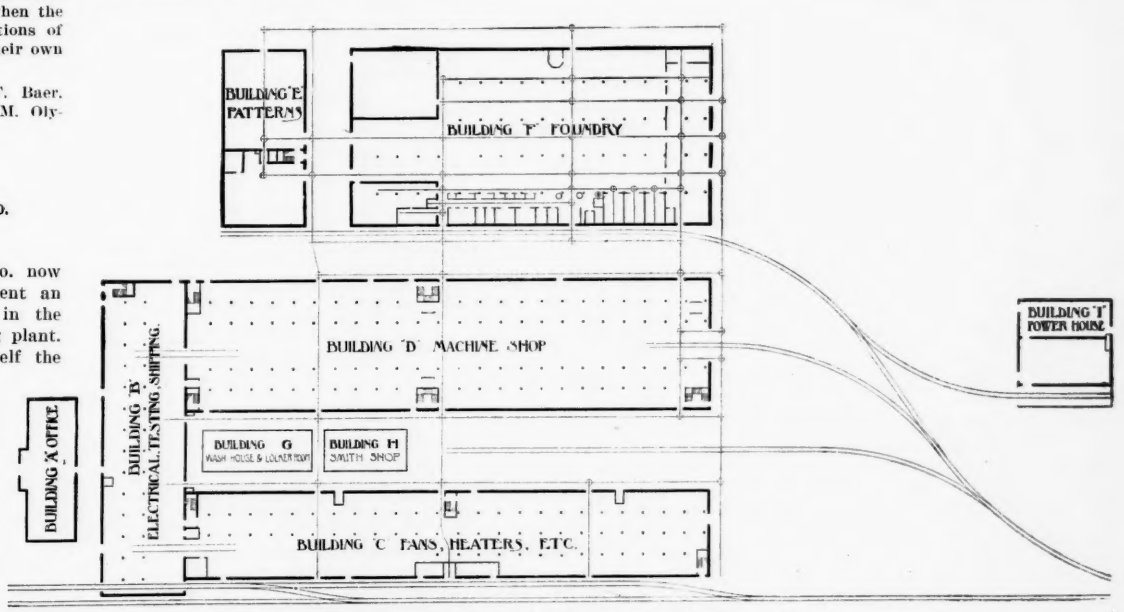
From the foundry the castings will pass to the rear of either the machine shop or the fan shop. The former is of the familiar gallery type, 500 ft. long, with wings 40 ft. wide, and central runway of the same width for crane of 20-ton capacity. The lighting will be principally by a series of sawtoothed skylights running crosswise of the roof with glass facing due north. The crane will serve the entire floor and transport heavy castings from the machine tools to the erecting floor, where the completed engine or generator may be lifted upon a transfer car passing through the testing building, and there picked up by another 20-ton crane, which will drop it upon the testing plate and subsequently carry it forward to the steam railroad track which passes through the end of the building and provides space for the loading of two cars at a time. The upper floor of this building, together with portions of the adjoining buildings, is devoted to the electrical department and provided with individual small traveling cranes.

The building devoted to the manufacture of fans, heaters, etc., is 80 ft. in width, of the same length as the machine shop, is three stories in height, of typical mill construction, provided with all conveniences for handling material, and arranged so that shipment can be made from numerous points along one side, while supplies are brought in from the court between it and the machine shop.

The smith shop, 40 ft. by 80 ft., serves both buildings with equal facility, while the wash house and locker room, measuring 40 ft. by 100 ft., and three stories in height, is so placed as to reduce to a minimum the distance to be traversed by the individual workman. The third floor will be used as a lunch room.

The standard first floor height in the main buildings is 17 ft., that of the second and third stories is 15 ft. The windows are large and numerous.

The equipment of this plant will be largely "Sturtevant" in its character. Beginning with the power plant, the mechanical draft apparatus, the engines and generators and the exhaust head will be of Sturtevant make. The buildings will be heated by the Sturtevant system, the shafting and individual machines driven by motors of the same make, the refuse from the woodworking machinery, the dust from the cleaning room of the foundry, the ventilation of the offices, toilet rooms, and wash house, and the removal of smoke from the smith shop will be accomplished by the Sturtevant exhaust fans, while Sturtevant blowers will be used for brass and iron foundry, forge shop blast and the like, and Sturtevant steam traps will be used upon the steam driers.


BUILDING 'E' PATTERNS
BUILDING 'F' FOUNDRY
BUILDING 'T' POWER HOUSE
BUILDING 'D' MACHINE SHOP
BUILDING 'A' OFFICE
BUILDING 'B' ELECTRICAL TESTING SHIPPING
BUILDING 'G' WASH HOUSE & LOCKER ROOM
BUILDING 'H' SMITH SHOP
BUILDING 'C' FANS, HEATERS, ETC.

New Plant of the B. F. Sturtevant Co., Hyde Park, Mass.

I lately made the following run behind one of the newest and biggest Belpaire coupled engines of the Midland, an enlargement on the type built last year. The load was 448,000 lbs. and the run of 50 miles to Bedford was made in 54 minutes, the speed not dropping below 48 miles an hour even up the long bank of 31.7 ft. to the mile. On the descent the speed rose to 80.4 miles an hour without in the least forcing the engine; there is no doubt that the engine could have done more had it been necessary. On a former occasion with one of the original class, No. 2,610, and a load of 514,200 lbs., the time was 54 minutes exactly, though the final 20 miles, all down hill, were run at slower speed than is usual. The almost continuous climb for the first 30¼ miles only took 36 minutes, the speed never dropping below 50 at the top of the 31.7 ft. grade. On this occasion the engine was said to have steamed less freely than usual, though the work was a great advance on that usually obtained. All loads are *exclusive* of engine and tender. R. HOPE.

Street Railroad Mutual Benefit Association.*

I take a street surface railroad in a growing community to be in the indicated class where assessment insurance can be, so far as the beneficiaries are concerned, profitably applied, as is evidenced by a case in point—the Metropolitan Street Railway Association of New York, with whose workings I am familiar and concerning which some details may be of interest.

This Association was organized in the spring of 1897 by the employees of the company at their own suggestion, and was so planned that any employee between the ages of 21 and 45, who had been in the service of the company three months, was eligible for membership upon the payment of an initiation fee of $1 and dues of 50 cents per month.

In return for these payments the Association guarantees to its members:

1st. In case of sickness, the payment of $1 a day for a period not exceeding 90 days in any one year.

2d. In case of death, the payment of $300 to any beneficiary named by the insured.

3d. The free service of a physician who devotes his entire time to the members of the Association.

4th. The use of reading rooms which are supplied with weekly and monthly papers and magazines, technical journals and a library consisting of over 2,000 volumes.

5th. Use of 10 pool tables, for which one cent per cue is charged.

6th. Free monthly lectures and entertainments during the winter months at the Association Rooms.

7th. Eligibility for pension under the pension regulations of the Metropolitan Street Railway Company.

The Association started with 30 members and from that time it has steadily grown until to-day it has a membership of over 4,500.

The Association is operated with absolutely no expense beyond the stipulated salary of a physician, as all the officers of the Association are officers of the company and their services to the Association are given gratuitously. The Association Rooms are given rent free by the Company; the Library and pool tables were donations from individual stockholders and directors.

This plan, which I believe with slight modifications is applicable to almost any railroad property of considerable size, has worked out, in its financial details, some surprising results; for instance, we found that the amount of the tax, 50 cents per month, is a trifle more than is necessary to pay sick benefits and supply a life insurance of $300, but it is so small, in each individual case, as to make an exact adjustment both inconvenient and impossible and hence there has grown up in this Association a practice of investing the surplus in the securities of the property on which the members are employed. And so we have in this Association the unique feature of every member contributing monthly, in an infinitesimal way it is true, to a proprietary interest in the property he helps to operate.

Before going further into the details of the workings of the Association and discussing the beneficent results it has accomplished for the men and owners of the property, I must, in order to be thoroughly understood, say a few words about certain human agencies, account of which cannot be taken in any written rules of practice.

The success of the Metropolitan Street Railway Association is primarily due, not so much to its sound economic features as to the personal relationship established and maintained between the responsible head of the company and its employees. All of us who have to do with masses of men are aware of the fact that it is not always easy to induce them to do that thing which is obviously for their betterment, whereas experience shows that when their sympathies are stirred and their feelings appealed to they can be and have been induced to the most suicidal courses.

The phenomenal success of the Metropolitan Street Railway Association is due primarily to an intelligent, sympathetic relation fostered and encouraged between the manager and his men who early realized that they were under the discipline of a man who was in thorough accord with them as a class and whose life experiences had been along the very lines they themselves were traveling. The fusing influence of this relationship, which is as active to-day as at any time since the formation of the Association, has welded the membership into a body, the tremendous force of whose loyalty has been frequently tested in critical emergencies.

The impetus thus given to this Association is great enough to assure its permanence beyond the accidental loss of the influence of the individual who is responsible for its present energy.

I have said thus much in order that I may not be misunderstood as imagining so vain a thing as that the mere formulation of a beneficent plan is sufficient to secure its success. In the application of social benefits, as in everything else of human devising, some vivid personal influence is necessary to success and this success, believe me, cannot be achieved by mere formal approbation or endorsement. If you want to make a concern of this kind go you must give it your time and thought and, above all, you must be convinced at bottom that it is the right thing to do and that it will succeed.

If I might presume, before proceeding to further discuss the results of associations, to make a suggestion to those contemplating an experiment in this direction, it would be to avoid patronizing the men. Many good things are spoiled by being overmagnified and it is my experience that among American and Americanized working men there is a resentment of *official* patronage. The quickening influence of the idea that you and your men are engaged on the same job but in different capacities, when once fixed, is surprising. It would be well, too, not to lose sight of the fact that the benefits arising from helping your men to take care of themselves are not all one-sided.

This thought brings me to a consideration of the benefits arising from associations.

These benefits may be divided into two classes: First, those derived by the employees, and, second, those derived by the employer. There is nothing which appeals more strongly to the large majority of people, certainly to those who have worked for a living, than those things which yield a direct or indirect financial return. No one can fail to see the great benefit which the distribution of from $20,000 to $25,000 a year means to the men who are working for wages, and without reserves to draw upon in cases of sickness or other disaster. The services of a physician, the free use of a library, the opportunity to play pool or billiards in a well lighted and well ventilated room at a nominal cost, are indirect financial benefits as well as pleasures which are assuredly appreciated by any body of intelligent workmen, such as are employed by street railroad companies. There is a benefit not so apparent but equally real in the creation and strengthening of a common spirit—*esprit de corps;* a realization of common interest in a work of many details but of common end. The gain is the greater as all employees are included, from the helper to the manager. The perfection of army organization is where the soldiers have entire confidence in the leader and the leader absolute trust in the soldiers. When something of the strength of all goes into the work of each, tasks are more easily done; there is more careful attention to details, a common interest taking hold beyond the working hours gives heart to labor when the time comes. A street railroad touches the public at numberless points; the work of its employees is at each of these points; work with something of heart in it is easier and better than mere hand and head work.

When one remembers that in such a scheme as I suggest there is no demoralizing taint of *official* charity and that the men are gradually realizing that in truth they are doing all the helpful work with their own money, he will realize that the moral uplift far exceeds any of the material advantages.

The benefits of the second class from these associations—those to the employer or stockholder—are not so tangible as those received by the employee, but nevertheless exist to a large extent and are apparent to those who are in close touch with the workings of such associations and their bearing upon the management of the company's affairs. It may be difficult to demonstrate to an outsider or to put your finger upon particular cases where the use of the library or the Association Rooms or the pool tables accrues to the advantages of the Company. It is unquestionably true in my mind, however, that all of these things create a certain sentiment in the mind of the employee favorable to his employers and which in times of labor troubles, when the misguided and unscrupulous agitator attempts to cause dissatisfaction, crystallizes into a feeling of loyalty toward the company which could not have been gained in any other way. . . . When you begin to wet-nurse and patronize working men you are offending them and making trouble. The idea is to teach them to help themselves.

As an illustration of what opportunity for amusement means to working men one of the pool rooms located at Fiftieth street and Seventh avenue takes in on an average of $45 per week. Several games of pool at a cent a cue must be played in the course of a week to make the receipts $45. . . .

The stockholders of a property not only look to the management for a return upon their investment but values once established they look for their stability and permanence. To assure this stability and permanence moral forces must be set to work and carefully fostered until they gradually become traditional with the concomitant result of loyalty and efficiency of service.

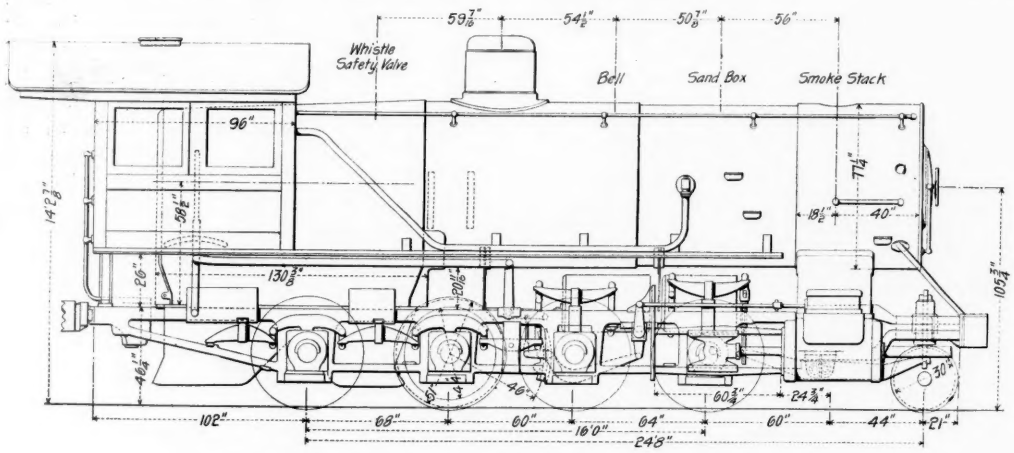
I believe that the interest the employees take in a financial investment of 50 cents a month in an association and the enjoyment of the opportunities afforded by the libraries, pool rooms and entertainments, etc., together with the personal contact between the employees and management, bring about a relation between them similar to that which the millions deposited in the savings banks bring about between citizens and their government.

*Extracts from a paper by Mr. Oren Root, Jr., presented at the Detroit Convention of the American Street Railway Association.

Consolidation Locomotive for the Pittsburgh & Lake Erie Railroad.

The locomotive shown herewith was built at the Pittsburgh Works of the American Locomotive Company for the Pittsburgh & Lake Erie Railroad. The total weight is 189,150 lbs., with 168,150 lbs. on drivers. The total heating surface is 3,040.6 sq. ft. The cylinders are 21 in. in diameter and have a stroke of 30 in. The engine is capable of exerting a maximum pull of 44,000 lbs. on a dry rail. While the adhesive weight would appear to be within the amount required on a hilly road, it is quite sufficient where these engines are to work, as the maximum pull is only used in starting. The ratio of 1 to 55, between square feet of heating surface and weight on drivers indicates that close attention has been given to the relation of steaming capacity to adhesive weight. A general description follows:

Fuel	Bituminous
Weight on drivers	168,150 lbs.
Weight on truck wheels	21,000 lbs.
Weight, total	189,150 lbs.
Weight tender, loaded	139,700 lbs.
General Dimensions.	
Wheel base, total, of engine	24 ft. 8 in.
Wheel base, driving	16 ft. 0 in.
Height of stack above rails	15 ft. 2⅝ in.
Heating surface, fire box	181.8 sq. ft.
Heating surface, tubes	2,858.8 sq. ft.
Heating surface, total	3,040.6 sq. ft.
Grate area	33.4 sq. ft.
Wheels and Journals.	
Drivers, number	8
Drivers, diameter	51 in.
Truck wheels, diameter	30 in.
Journals, driving axle, size	9½ x 12 in.
Cylinders.	
Cylinders, diameter	21 in.
Piston, stroke	30 in.
Boiler.	
Boiler, type of	Straight top
Boiler, working steam pressure	200 lbs.
Boiler, diameter of barrel	76 in.
Crown sheet stayed with	Radial stays
Fire-box.	
Fire-box, length	10 ft. 0 in.
Fire-box, width	3 ft. 4⅛ in.
Grate, kind of	Cast iron, rocking
Tubes.	
Tubes, number	370
Tubes, outside diameter	2 in.
Tubes, length over sheets	14 ft. 10 in.
Tender.	
Tank capacity for water	7,000 gal.
Coal capacity	14 tons
Type of truck	Fox pressed steel
Type of tank	Hopper



Consolidation Locomotive for the Pittsburgh & Lake Erie.

Foreign Railroad Notes.

The attorneys of the Russian railroads are not likely to get rusty. In 1900 3,714 suits for damage were brought against the St. Petersburg & Moscow road for the aggregate amount of $1,600,000; 7,251 suits against the Warsaw Railroad, 6,665 against the Southwestern, and 15,359 against the Rjasan & Ural Railroad. The latter company had to defend itself before courts in 362 different places.

The northernmost part of the railroad on the east bank of Lake Como, from Colico to Chiavenna, 17 miles, and the branch of it from Colico east to Sondrio, 25 miles, long worked by steam locomotives, have been electrified by Ganz & Co., of Budapest, and trains began to run by the new power Sept. 4, four express, 20 passenger and four freight trains running the first day.

The Hungarian Manufacturers' Society, complaining of great dulness of business, urge the government to undertake great improvements in road and rolling stock and much new construction, in order to give them something to do.

At a meeting of the Railroad Science Society in Berlin, Sept. 9, which was attended by Gen. Budde, the Minister of Public Works, the speaker, discoursing of re-

cent measures for securing safety of trains adopted by the Prussian State Railroads, said that to cover trains halted on the open road between signal stations, when dark or foggy, magnesium torches which burn with a red light will be used. The light of these, he said, even in fog, can be seen 500 or 600 meters (say a quarter of a mile). It is intended to supply every train with a number of such torches, each of which will burn for five or six minutes. Another measure contemplated is the equipment of all block stations with telephones, which will enable the signalmen to communicate with each other and with the adjacent stations.

Dangers of the Present Situation in the United States.*

The national prosperity is again the theme of universal comment here, owing to the apparent new lease of life accorded to it by nature through this year's bountiful crops. It is nowadays held to be only just short of treason to question, even by implication, the entire perfection of our financial and commercial being in all its details.

Your readers, however, I take it, are people who are sometimes less interested in the stock lists of to-morrow than they are in the study of economic tendencies, and the main currents of commerce and finance. Perhaps you will allow me to direct their attention to three features of the present situation, which I think are of some importance. These are:

1. The development of unsound financial methods in corporation affairs.
2. The unrest of labor, and
3. National extravagance.

A few words of comment on each may serve to make plain what I mean.

1. There is a clearly marked tendency towards a reversal of that process of reorganization which brought railroad and industrial finances into order in the 1893-7 period of depression. In that period fixed charges, with foreclosure rights, were largely converted into merely contingent charges. First mortgage bonds in some cases became preferred, and even common stock. Now, in the last twelve or eighteen months, there has been quite a strong movement in the other direction. I need not multiply instances, and will simply mention the following companies in which, in one way or another, stock equities have been converted into fixed debts of one kind or another:

The American Tobacco Co.
Central Railroad of New Jersey.
Chicago & Alton.
Chicago & Eastern Illinois.
Chicago, Burlington & Quincy.
Chicago, Indianapolis & Louisville.
Chicago, Rock Island & Pacific.
Louisville & Nashville (according to rumor).
Pennsylvania Coal Co. (Erie guarantees).
Pocahontas Coal Co. (Norfolk & Western guarantees).
Pocahontas Coal Co. (Erie guarantees).
United States Steel Co. (proposed).

And, looking over the list hurriedly, it appears that in place of some 650 millions of stocks there are proposed to be issued, or actually issued, some 900 millions of bonds. I do not offer the list as either strictly accurate or complete, but it serves excellently to illustrate the way in which the future is being fearlessly mortgaged by the very financiers who were prominent in the work of reorganization some six or eight years ago.

I have space but to note in passing the extensive purchases (for control) or lease of one company by another and the issuance of bonds in payment, *e. g.*, the purchase of Northern Pacific Stock by Union Pacific, and the issue of Union Pacific convertible bonds and Oregon Short Line participating bonds therefor.

2. The unrest of labor in this country is something that is beginning to disturb thinking men. Labor to-day feels that it can save much less of its wages than it could three years ago, and naturally wants a larger share of the prosperity it sees all around. Its claim may be just or unjust; I am not discussing that question. That it is about to make this claim is, however, clear to all who can see an inch beyond their noses. When to this is added the natural effect of wholesale "trust-making" upon popular sentiment—I am taking things as they exist, without discussing their rights and wrongs—it is evident that the materials for extended and, perhaps, prolonged labor troubles are all present in the situation to-day.

3. That the nation has, as a whole, departed from the habits of strict economy which were so general in the depression period and in the early days of the present "boom," is reasonably clear. I do not refer alone to the extraordinary outburst of vulgar ostentation and spectacular gambling that has characterized a certain section of "society" in this country of late—although that is by no means devoid of economic significance. It is a matter of common knowledge that people, as a whole, in all walks of life, are spending a much larger proportion of their income than they formerly did—than they did five or six years ago. I am told, for example, that the New England savings bank statistics clearly show the saving habits of that most thrifty community to have undergone a marked change in the last two or three years, and to indicate that, relatively, little money is now being saved. Our foreign trade figures are beginning to show a national tendency in the same direction. Admitting that much of this is merely a proper reflection of the increase in national prosperity, the fact remains that extravagance is a very prominent feature of our social life at this time.

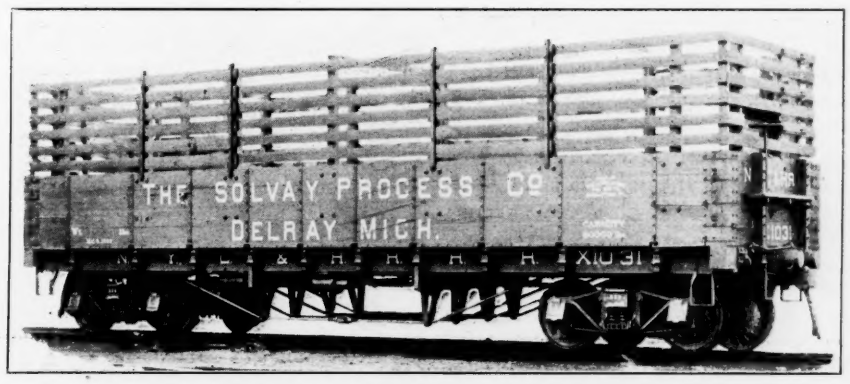
Now, these three things that I have mentioned—unsound finance, labor unrest, and national extravagance—must be regarded as signs of warning to all who are interested in our affairs. They have in the past unfailingly marked the close of periods of great prosperity, containing, as they do, the seeds from which spring periods of relative depression.

New York, Sept. 1.

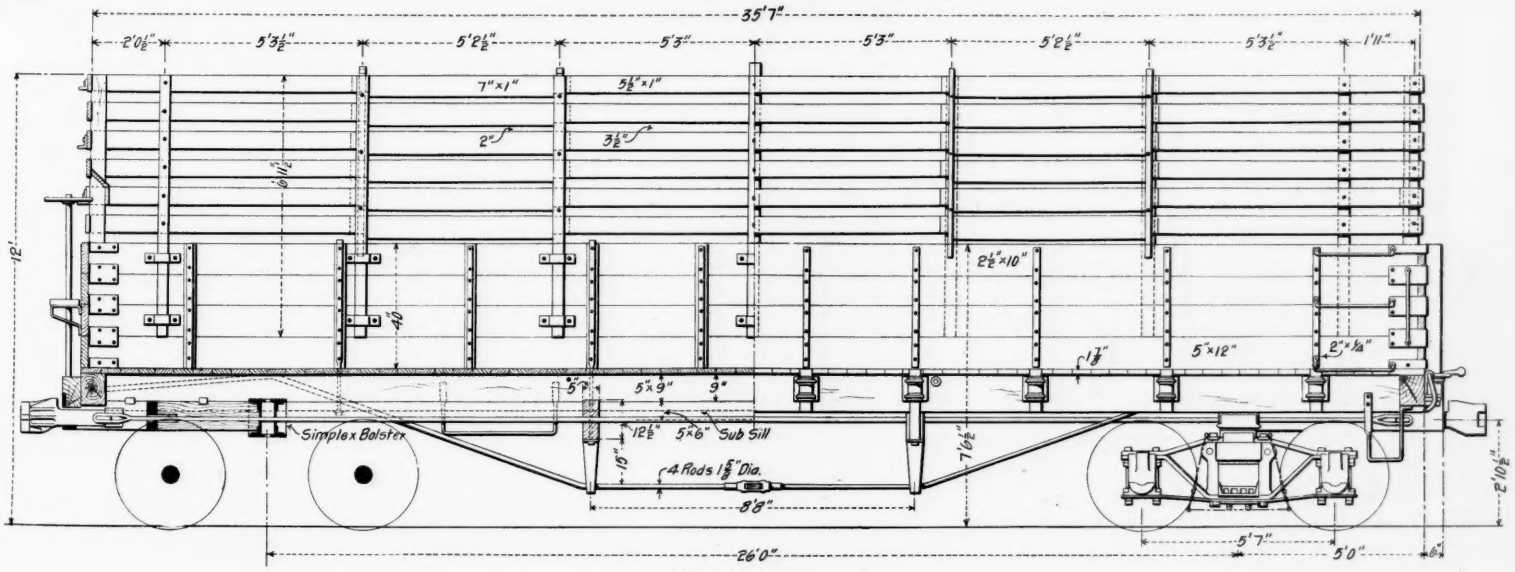
*Some extracts from a letter to *The Economist* (London) by Mr. Thomas F. Woodlock, editor of the *Wall Street Journal*.

40-Ton Gondola Car with Coke Rack.

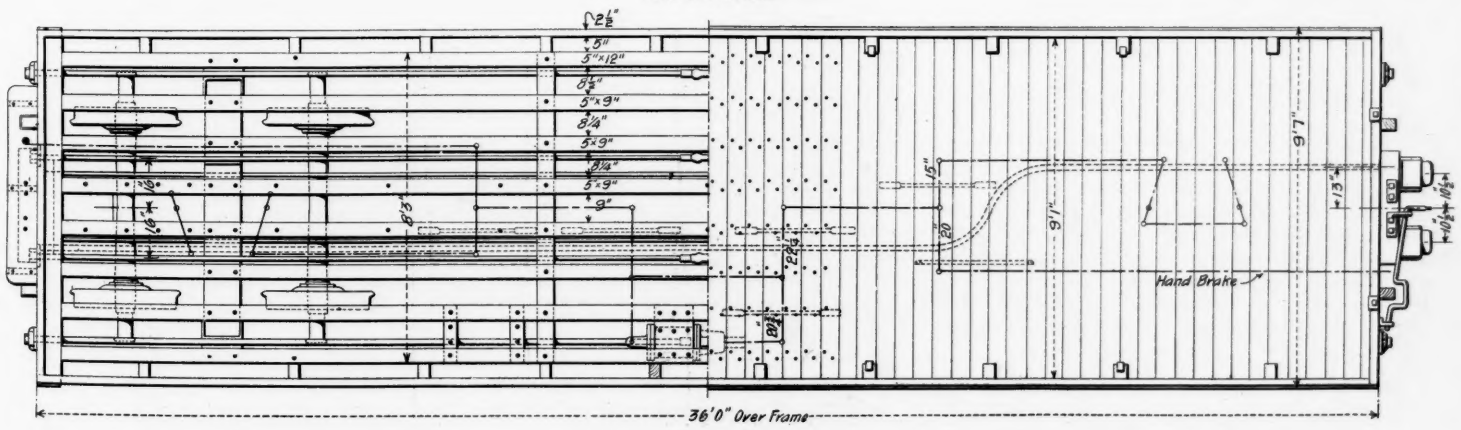
The car shown in the accompanying engraving is one of a lot of 60 recently built by the Middletown Car Works for the Solvay Process Co. Thirty of these cars were built with coke racks, as shown, and 30 without. They present a good example of attention to detail, the whole design being uniformly simple yet substantial. The cars are fitted with inside stakes and this arrangement adds considerably to their cubic capacity, as will be seen from the inside dimensions, length 35 ft. 7 in., width 9 ft. 1 in., and height 7 ft. 9½ in. with rack, 3 ft. 4 in. without rack. A good brake arrangement and advantageous grouping of body truss rods to give ample wheel clearance and at the same time secure maximum depth of truss at the center of car, are the most interesting features of the design.



40-Ton Gondola Car with Coke Rack.



Side Elevation.



Plan.

40-Ton Gondola Car with Coke Rack.

RAILROAD GAZETTE

ESTABLISHED IN APRIL, 1856.
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EDITORIAL ANNOUNCEMENTS.

CONTRIBUTIONS—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussion of subjects pertaining to ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

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The compilation of railroad gross earnings for the month of September, as made by *The Chronicle*, shows a gain of 9.55 per cent. as compared with 1901. This is on about 90,000 miles of railroad. The anthracite roads are not included, but they never are in the preliminary statement. So far as they are concerned, therefore, the strike does not figure in this compilation, but undoubtedly it has affected other roads, some of them unfavorably and some of them favorably. The strike of bituminous coal miners in West Virginia also did something to diminish earnings. Again, comparisons are made with the month of great travel to the Pan-American Exposition at Buffalo. Altogether the returns last month were as favorable as one could hope for.

The convention held last week at Detroit by the American Street Railway Association was an event full of interest for many steam railroad men. That man must be dull, or closely occupied in his own narrow field, who does not see the rapid development towards close relations of the steam and electric roads. To those who went to Detroit, even to many electrical railroad men, the object lesson shown by the electric lines in that vicinity must have been instructive, not to say startling. They saw fast, heavy, well-equipped cars carrying not only passengers but freight and express parcels, running far out into the country. One of these groups of lines, as Mr. Vreeland says, reaches west, with only a slight break, as far as the eastern shore of Lake Michigan, and will probably, before long, find entrance into Chicago. We know well that it has been for some years the expectation of the President of the Detroit, Ypsilanti & Ann Arbor Railroad to gradually connect up a system from Detroit to Chicago. Some of these roads are parallel with steam lines, and have practically destroyed their local passenger traffic; others are serving farming districts which have heretofore been remote from railroad stations. Some of them supply not only transportation but light for the villages, and may, in years not far ahead, supply power. It is impossible to foresee the changes in transportation which electricity will bring about in the next decade, but it seems obvious that it is the business of the leaders amongst the steam railroad men to see that the electric roads become their allies and helpers rather than their competitors. In that direction a great work will doubtless be done before many years pass. A significant suggestion in Mr. Vreeland's address is that membership in the American Street Railway Association should be opened to steam railroad men. They can now join the Association only as representatives of some street railroad company, but many of them are certain to soon be representatives of companies working electrical roads. Indeed, a movement was started at Detroit looking towards organizing another body which should be, perhaps, a kind of Master Mechanics' Association for electric roads. There are several important suggestions in Mr. Vreeland's pithy address, and considerable extracts are printed from it on another page.

The most illuminating contribution to the discussion of the safety of passengers on electric railroads which has yet appeared is that of Mr. C. R. Barnes, presented to the New York State Street Railroad Association at its last meeting, and reprinted in large part in the *Railroad Gazette* to-day. Mr. Barnes has had the opportunity of investigating the subject at first hand and he is a careful observer. He tells only what other observers have long been morally convinced of, but his testimony is well worth reading, nevertheless. It is important to have such facts stated by an authority. On one point Mr. Barnes sets a standard for the street railroad men which is not high enough. He tells them that their telephone despatching is not conducted with proper safeguards, and declares that the regular steam-railroad method of despatching—by telegraph, with duplicate orders—is the ideal. It is true, no doubt, that, taking things as they are, telegraph despatching affords greater safety than most despatching done over telephones; and that most electric-road despatching lacks important safeguards which are regularly employed on steam railroads. But the despatching of the steam railroads, which is conducted according to the Standard Code and is the ideal that Mr. Barnes holds up for emulation, is *not* ideal. The steam railroads have numerous and disastrous butting collisions, as recent Government records show. The Code constitutes a more or less perfect theoretical ideal, but the practice under it discredits the ideal. Although the Standard Code has been in general use a dozen years, the percentage of mistakes under it continues too large. With the best class of despatchers and trainmen, well trained and well disciplined and not overworked; and with a non-fluctuating traffic, a record for safety could be made which would be far above any record published (for all records include both the well-managed and the badly managed roads); but in setting up an ideal it is not safe to assume this favorable condition. Experience shows that allowances must be made. The lowest standard that can be taken for an ideal is the space interval or block system. Even that has its limitations. The carrying of 1,500 million passengers in England without killing a single one—a marvelous record—does not by any means assure us against a "failure of block working" within the next year. But the block system is immeasurably safer than the "American despatching system" and experienced standard (steam) railroad officers who still hold the latter to be an ideal system, are very few and far between.

But, the block system aside, why should the telegraph be considered safer than the telephone for sending train orders? In telling the electric men to copy the practice of the steam roads, Mr. Barnes looks, of course, at other features than the mere instrumentality for transmitting the words over the wires; the rules for writing, reading, delivering and executing the orders are all of prime importance and constitute elements of the ideal that he sets up; but yet the telephone appears to be the principal feature in electric-road practice that he objects to. Certainly its alleged faults are prominent in many (steam) railroad officers' minds, for some of them have publicly expressed their distrust of any plan for sending spoken words over the wire instead of dots and dashes. What ground exists for this distrust? So far as we can see, it is based wholly on questions of discipline and detail. No one disputes the fact that words can be transmitted by telephone; nor that they can be written down by the person receiving them; nor does any one claim that, with the best wires, instruments and fixtures the chances of interruption and delay are any greater than with the telegraph. An operator speaking by telephone may enunciate indistinctly; but Morse operators often send poorly, so that the receiver has to request a repetition. Receiving by telephone, you may be in doubt about a word and may use up time in getting your doubt removed; but the same is true in telegraphing. The telephone sender may be too fast, leading the receiver to write the order in a slovenly style; but the same difficulty has been met, and has had to be cured, in working by telegraph. All these difficulties have had to be met and cured by any superintendent who has succeeded in establishing good telegraph service. The proof of the pudding is in the eating. The Pennsylvania Railroad has used the telephone for train orders for six years or more and has succeeded, without any more difficulty than would attend the same enterprise in the telegraphic field, in establishing good discipline and safe working. Other roads, for example the Illinois Central, have also used the telephone. Mr. C. A. Hammond has described, in the *Railroad Gazette*, his perfectly satisfactory use of the telephone for despatching, ten years ago. Why should we not regard the question of the telephone versus the telegraph as already settled, so far as technical availability is concerned?

Some people seem to be deceived by the fact that the telegraph continues in service everywhere; it is not abandoned, therefore it has been found impossible to abandon it. This conclusion does not necessarily follow. In the first place, the universal availability of the telephone has existed only a few years. It was not until the expiration of the principal telephone patents that the telegraph could be abandoned, except at large expense. On many railroads, perhaps most, where the telephone has been considered but has not been adopted, the decision appears to have hinged on the simple conclusion that the proposed change would *not* save any money, while it *would* necessitate new expenditures. We do not say that this decision was wise; but it may have seemed wise at the time. The telephone would not effect an appreciable saving, because the Morse operators were receiving no higher wages than would have to be paid for competent non-telegraphers to handle train orders; and a considerable investment would be required for double copper wires and new instruments. The fact that any person can receive orders by telephone is not an unmixed advantage, for the keeping of this work in the hands of a few designated persons is an element of safety. There is one more thing that is to be considered in connection with the telephone; its quickness. Mr. Barnes severely criticises, and with justice, the assertion that the telephone is especially well adapted to making meeting points for electric cars, because "a train can be handled in ten seconds." Orders can be handled more quickly than by telegraph. With "the American despatching system" everything designed to save time must be suspiciously scrutinized. Lives and property depend on every meeting order, and careful transmission and repetition are of the first importance. But the time is coming when this close attention to checks will be unnecessary. The block system will be used to insure safety, and the function of the despatcher's orders will be only to promote convenience and celerity. An operator will, by his regular routine communications to and from the next station, secure trains from collision, without regard to whether the meeting points are made by the timetable or by the despatcher; and a despatcher's orders can, therefore, cause no collision even if they contain errors. When that enlightened time shall come, the telephone will be as useful on the train wire as it now is in business offices.

Three Months of Per Diem.

With the meeting of the American Railway Association at Detroit, Oct. 22, we shall have arrived at the first mile post in the per diem car-service reform; and, so far as can be judged from what the officers of the principal roads are saying, the Car-Service Committee will be able to report satisfactory progress. The new plan has not yet been in use long enough to enable any road to base judgments of much value on what can be learned from the financial results to its own treasury, and the statements of striking changes in cars lent and cars borrowed which are made by many roads for the month of July cannot be repeated indefinitely; moreover the question of what shall be allowed on switched cars is still open, because the rate is still subject to adjustment at many places.

But the main purposes of the change have been and are being accomplished. Cars away from home are being paid for on a business basis. Cars held by one borrower more than 30 days are being paid for at a penalty rate. Settlements between one road and another are made on a basis which makes errors discoverable and discourages guile. The great injustice due to the excessive use of cars as storehouses by consignees has been materially mitigated, and the proper assessment on consignees of reasonable de-

murrage charges is likely to be very generally accomplished. Already, thousands of consignees have been required to pay for the use of standing cars where formerly there was constant abuse.

The most that the Car-Service Committee claimed in its report last April was that the rules which it recommended would promote efficiency, economy and honesty. This they certainly have done. The most difficult questions—those of switched cars and those concerning embargoes—have not proved more difficult than was expected. The arbitration committee has had no important questions before it, except questions of accounting and detail, and, we understand, no real controversies whatever. While it is perhaps too early as yet to ascribe great importance to such a fact as this, it is a good sign, and we are justified in looking upon it as an evidence of the determination of all the roads to do everything possible to preserve harmony. This is no small accomplishment, for cases affording ground for disputes about details, or about small transactions, are, of course, common on every road, every day. The two superintendents who met and discussed their respective claims and grievances against each other, and who then decided that each would swallow his own grievances and abandon all his claims, seem to have hit upon the happiest possible *modus vivendi*; and the general absence of reports of friction appears to indicate that they have had many imitators.

Of the large questions which are still in the future, that concerning the compensation for private cars is perhaps the largest. At least one railroad has turned over some of its own cars to a private car company, so as to get a higher income from them than it could get directly. Tricks of this kind are, of course, to be expected in any movement of such national magnitude. But one abuse—even such a large one as the private-car evil—cannot be allowed to hinder a reform affecting the whole country and involving many millions of dollars. The readjustment of rates which are inequitable is, of course, going to demand much care. The general exchange rate itself, twenty cents a day, will have to be increased some time. At present, however, the reclaim rate at large terminals is a more immediate question. The Chicago & North Western, which was one of the most strenuous objectors to the adoption of a per diem rate, is now earning about $5,000 a month less on "switched cars" at its Chicago terminals than before July 1, and the management of the company will undoubtedly do all it can to recover this lost revenue. The Chicago agreement provides for a five-day reclaim, while the North Western, with its complicated junctions and connections and its 12-mile and 15-mile hauls is often unable to return cars in less than eight days. But we cannot believe that problems of this kind will not be settled, for as long as "efficiency and economy" are kept in view as the objects to be attained everybody must see that the old plan was wrong and that the new one is right. The essential point is to hold up to this standard all the parties concerned. "Economy" in handling cars means that no power be wasted, no cars be allowed to stand idle unnecessarily, and that the cost of each element in the service be borne by the party for whose benefit it is performed. Being interpreted, this means that, if the North Western was getting only a reasonable profit before, either the consignee or the road which absorbs the switching charge is now getting a benefit for which it pays too small a price; and who can complain at a readjustment for the correction of this inequality?

There are some developments which may furnish excuses for decrying per diem, but which the system is not responsible for. For example, those roads which are now short of locomotives will have to pay out a good deal of money for cars which they have accepted but cannot move forward; but certainly the lender of the cars cannot afford to stand that kind of a loss. The borrower is rightly confined to the alternative of paying for the cars or refusing to accept them—unless he can convince the lender (in each case) that an allowance should be made. Another irregularity is the retention and use of borrowed cars in local service. With business constantly offering in excess of facilities many a road is now glad to borrow cars in large numbers at 20 cents a day, or even five times that sum. As a consequence, car-service superintendents are now finding conditions quite different from what they were in July and August. The early enthusiasm is very much modified. But here again the evil cannot be held sufficient to offset the benefits of a just and economical plan of payment. Abuse of cars by borrowers must be curable by some means, but that means is *not* a return to a former payment-plan under which the abuse originated.

On the whole, we may expect to see those managers who attend the Detroit meeting return to their homes with their zeal of last April not only maintained but increased.

Annual Reports.

Reading Company.—The report of the Reading Company for the year to June 30 is dated Oct. 13, which, by a peculiar coincidence, is the date of the proposition of the presidents of the anthracite roads for arbitrating the questions in dispute between the companies and their men. That strike began on May 12, and therefore the present report includes one and one-half months of the period when production of coal from the collieries of the company was entirely suspended. Despite the consequent serious loss of tonnage and revenues, the preceding period of the fiscal year has yielded such increased traffic and revenues that there is a reported decrease of only $796,278, or about 1⅓ per cent. in the gross receipts of the three Reading companies, and an actual increase in net earnings of $689,000, with a loss in surplus through larger charges and taxes of $284,300. The revenues and expenses of the three companies are reported by the company as follows:

	1902.	1901.	Inc. or Dec.
Gross receipts	$61,347,193	$62,143,471	Dec. $796,278
Gross expenses	45,135,549	46,621,008	Dec. 1,485,458
	$16,211,643	$15,522,463	Inc. $689,180
Fixed charges & taxes	13,832,817	12,859,376	Inc. 973,441
Net income	$2,378,826	$2,663,087	Dec. $284,261

The increase in charges and taxes is referable chiefly to the payment of a full year's interest in 1902 upon the collateral trust bonds issued to take over the majority of the stock of the Central Railroad of New Jersey, as against three months' interest in 1901. There were also payments of interest on two series of car trusts issued in the year. The income from dividends on Jersey Central stock holdings now equal the interest on the collateral bonds, but as the increased dividend accrued only for the last half of the Reading's fiscal year, there was a considerable excess of interest payments on account of the Jersey Central over the direct income received.

The table of receipts and expenses as given above includes a considerable amount of duplication of items between the three companies, receipts of the Reading Company, amounting to $5,312,129, being made up chiefly of rental received from the railroad company for equipment used, interest on a debt of the coal and iron company to the Reading Company, etc. The income accounts of the two operating railroads are shown below:

Railroad Company:	1902.	1901.	Inc. or Dec.
Gross receipts	$29,515,535	$28,344,170	Inc. $1,171,365
Operating expenses.	16,516,496	15,742,920	Inc. 773,576
Net earnings	$12,999,039	$12,601,249	Inc. $397,790
Less:			
Insurance fund	246,044	233,935	Inc. 12,109
Equipment renewals	666,133	650,508	Inc. 15,625
Improvements	1,341,326	1,938,989	Dec. 597,663
Total spec'l charges	2,253,503	2,823,432	Dec. 569,929
Net income	$10,745,536	$9,777,818	Inc. $967,718
Fixed charges & taxes	9,519,123	9,211,197	Inc. 307,926
Surplus	$1,226,412	$566,621	Inc. $659,791
Coal & Iron Company:			
Receipts	$26,519,530	$28,917,858	Dec. $2,398,328
Expenses	24,156,893	25,887,283	Dec. 1,730,390
Net earnings	$2,362,637	$3,030,575	Dec. $667,938
New work at coll'r's	863,428	806,308	Inc. 57,120
Depletion of coal lands fund	374,101	413,053	Dec. 38,952
Int. on debt to Reading Co.	888,781	886,505	Inc. 2,276
Balance	$236,327	$924,709	Dec. $88,382
Charges and taxes.	419,859	369,315	Inc. 50,544
Deficit	183,532	*555,395	Inc. 738,927
Reading Co. surplus	1,335,946	1,541,072	Dec. 205,126
Surplus, 3 Co.'s	2,378,826	2,663,087	Dec. 284,261
Gen. mortgage sinking fund	443,935	366,371	Inc. 77,564
1st pref. stock div.	980,000	934,735	Inc. 45,265
Balance	$854,891	$1,361,981	Dec. $507,090

*Surplus.

These results were secured by the company under many adverse circumstances, the strike declared May 12 being only the last in a series of disturbing circumstances. Disastrous freshets in December, 1901, and March, 1902, flooded many of the collieries, drowning out a number so that they could not be operated for months. There was an increase in the cost of mining coal through extra expenses on account of these freshets and because of the higher wages paid on the basis of the settlement of October, 1900, with the striking coal miners. The company suffered also, as President Baer points out, "from loss of production caused by the lessened efficiency of labor," which, as the world knows, came to a climax in the strike of all the anthracite coal miners ordered on May 12, and lasting five months.

Under all these circumstances therefore it must be considered that the Reading Company did remarkably well in the past year with its increase of $1,171,400 in railroad receipts and $398,000 in net operating receipts. With the Coal & Iron Company the decrease in gross receipts of $2,398,000 compares with an increase of $1,033,000 in the previous fiscal year, when, as will be remembered, the anthracite companies also suffered from a six weeks practically total suspension of mining because of the strike of September and October, 1900.

The company continued its policy of previous years in making very heavy appropriations out of current income for improvements and other additions on both the railroad and the coal properties. Although the special appropriations by the railroad were $507,000 less than in 1901, the extraordinary improvements charged against income in 1902 were $1,341,300. With deduction of this item and of $246,000 as an addition to insurance fund by the railroad, and appropriations of $863,000 for new work at the collieries and of $374,100 as a sinking fund at the rate of 5 cents a ton for coal mined by the Coal & Iron Company, the surplus of the three Reading companies amounted to $2,379,000. This is chargeable with the sinking fund of 5 cents a ton on coal mined from the company's properties, due as a sinking fund for the general mortgage bonds before payment of dividends could be made, this sinking fund payment amounting to $444,000 last year.

The company's income statement shows only one payment of 2 per cent. on the first preferred stock charged against the year's surplus, but the company really paid two semi-annual dividends; one of 1½ per cent. in September last, and the other of 2 per cent. in March last, calling for $980,000 together, leaving a balance to be carried into the new accounts on the year's operations of $854,900. Since the fiscal year was closed the company has declared another semi-annual dividend, which, if it had been at the 2½ per cent. rate of March, would have dissolved the Voting Trust of the company. Instead, however, the directors declared a dividend of 1½ per cent., so that the Voting Trust is continued for another year at least. In view of the severe losses which have been sustained with coal mining suspended for 3½ months of the new fiscal year, it may be presumed that the full 4 per cent. dividend on the first perferred stock is not likely to be soon renewed.

The year's traffic was so seriously affected by the coal strike that comparative statistics have less value than usual, but the movement in 1902 and the changes from 1901 were:

	1902.	Inc. or Dec. from 1901, per cent.
Tons anthracite	9,465,953	Dec. 10.05
Tons bituminous	6,087,088	Inc. 21.29
Tons merchandise	16,413,700	Inc. 12.92
Number of passengers	24,987,177	Inc. 10.09

This increased traffic made necessary increased facilities, new track connections and improvements of the property. The principal expenditure of the railroad, provided by the appropriations out of income were:

Real estate	$159,278
Second and third tracks	187,677
Yard, passing tracks, etc.	212,199
New bridge work	221,245
Interlocking plants and signals	164,209
Docks and wharves	105,725
Stations and other buildings	171,873

The work of protecting the line between Reading and Harrisburg with signals, begun in 1901, was completed during the year. So far as protecting the line by means of signals is concerned, all of the most important work has been done and the expenditures hereafter will be principally in the way of renewals, etc.

These charges against income for new work by both the railroad and the Coal & Iron Company have been increasingly heavy every year since the reorganization. In five years they have amounted to $9,810,500, and including coal and coal land depreciation funds, the Reading has turned back into its property $12,542,000 of its income since 1896, as appears from the summary below:

	Railroad Improvements.	New work and collieries.	Depreciation funds.
1902	$1,341,326	$863,428	$818,036
1901	1,938,989	806,308	779,424
1900	1,903,797	750,499	1,133,679
1899	837,370	377,926	.....
1898	360,222	630,624	.....
Totals	$6,381,704	$3,428,785	$2,731,139

Another source of large expenditure was in meeting the demand for additional equipment, $2,500,000 car trusts (the fourth series of the company) being issued to meet the cost of rolling stock ordered in the year, costing $2,706,600.

Since the organization of the company, in December, 1896, the average value of all locomotives has increased from $4,906 to $5,971; the average value of revenue freight cars has grown from $383 to $527, and the steam colliers and tugs, whose average value in 1896 was $41,533, was, on June 30, 1902, $46,201. The total value of the rolling equipment in the company's possession, including that owned and leased, has increased from $16,990,856 as of December 1, 1896, to $27,949,738 as of June 30, 1902, and the value of floating equipment has increased during the same period from $1,439,850 to $2,947,937, making a total increase of value of $12,466,969. Of this total $9,478,640 has been provided by issue of car trusts and $3,007,163 by proceeds of securities sold by the Reading Company. In 1902 the Reading Company capitalized equipment expenditures for $1,192,267, this being included in the issue of $1,500,000 of new general mortgage bonds, but these bonds, together with about $119,000 issued to retire prior liens, were on June 30 held in the treasury unsold. The Reading Company also issued and sold in the year $380,000 purchase money mortgages for the new Port Richmond warehouse for export freight and for real estate.

Despite the company's experience with its coal miners, it is going ahead with plans for a railroad pension fund. Thirty employees have been placed on the pension roll, on half-pay, preparatory to putting in effect a general pension system this year.

The management has decided that in view of the steady increase in the consumption of anthracite coal and in order to meet the loss of production caused by the lessened efficiency of labor and by reason of the exhaustion of certain collieries, to expend about $3,500,000 in sinking seven new shafts and the construction of new breakers, machinery, etc. This amount will be expended

proportionately during the next five or six years and can be paid for either out of the net revenues of the company or from the Depletion of Coal Lands Fund.

Chicago & Alton.—The second report since the Chicago & Alton Railway Co. took over the Chicago & Alton Railroad shows a little gain in both passenger and freight earnings. Mileage remains unchanged at 902; in fact, the only addition to the system in many years has been the 57½ miles of the St. Louis, Peoria & Northern, bought in 1899. For some years there had been a declining business, resulting in a decreased income available for dividend; but the gains last year in traffic moved, as compared with 1900 or 1899, were very great indeed, and net earnings would have shown a more important increase had it not been that a serious drought and the expenses caused by the wreck at Norton, Mo., in July, 1901, added over $500,000 to extraordinary expenditure; thus net earnings decreased to $3,201,820, as against $3,440,987 in 1901.

Gross earnings for the current year are $9,225,739, against $9,036,656 last year. The increases are divided quite evenly between the two classes of traffic, although the failure of crops greatly lessened the receipts from agricultural products, amounting this year, in the case of the Alton, to a decrease of nearly $285,000. But there was an increase of $405,145 in manufactures, coal and lumber. The development of traffic is shown by the table.

	Gross earnings.	Gross, per mile.	Passenger miles.	Ton miles.
1899.....	$6,546,590	$7,766	105,873,965	519,191,291
1900.....	7,796,450	9,119	120,360,469	629,994,662
1901.....	9,036,656	9,826	132,887,965	823,069,718
1902.....	9,225,739	10,032	138,591,837	902,745,440

In the year the ton-miles increased 10.9 per cent., but the freight train-miles *decreased* 0.1 per cent. The revenue train-load was 316 tons, an increase of 9.8 per cent. The total freight train-load was 344.6 tons as against 186.8 in 1898.

Maintenance of way charges decreased from $1,109,514, or $1,206 per mile, in 1901, to $959,331, or $1,043 per mile. The President considers the decrease normal, following the "heavy increases of the last three years," but the figure for 1900 was only $881,575, or $958 per mile—less than that for the current year. It is pointed out, however, that tie and rail renewals during the last three years cover over 40 per cent. of the mileage, and renewals of joints, frogs and switches average a figure considerably higher. Over 800 ft. of plate girder bridges and 150 ft. of new truss bridges have also been erected since 1899, and well over half the system is now ballasted with stone.

Maintenance of equipment called for an expenditure of $1,042,078, or $1,113 per mile of road; an increase of $162,666 over 1901, largely occasioned by bad water during the drought, which is also responsible for an increase in the cost of conducting transportation. Since the present management took charge, 93 new locomotives have been added, representing over 45 per cent. of the total equipment, and as this motive power was mostly new in 1901, charges for maintenance were largely held over until the current year. The average cost of repairs per locomotive was $2,952.

The report is not as complete as could be wished in regard to the details of improvement work, either that done to capital account or to income account. "Construction expenditures" during the past year amounted to $2,365,422, and $3,707,824 in 1901. Capital expenditure on roadway and structures was $2,167,794; slightly less than for the year previous. The statistics are so arranged that there is no way of positively determining which of the improvements are charged to capital account.

Equipment of the line with block signals was commenced under the present control, and has been pushed. Sixteen high semaphore signals were erected at switches during the year, making a total of 172 switches thus equipped. Signal work in 1902 also includes six interlocking plants, making a total of 25; 20 electric block signals, etc. Ten new coaling stations with special conveying devices were added during the year, and important changes were also made in the water supply. The chief statistics of operation are as below:

	1902.	1901.
Miles worked (17 1/3 trackage)..	919.6	919.6
Gross earnings.....	$9,225,739	$9,036,656
Operating exp. (excluding taxes).	6,023,919	5,595,668
Net earnings.....	3,201,820	3,440,987
Income from investments.....	1,525,622	1,525,622
Miscellaneous income.....	2,517	5,759
Total income.....	4,729,959	4,972,368
Total charges.....	3,904,618	4,123,461
Surplus.....	825,341	848,907
Freight earnings.....	6,127,504	5,954,141
Passenger earnings.....	2,578,468	2,573,149
Maintenance of way.....	959,331	1,109,514
Maintenance per mile.....	1,043	1,206
Maintenance of equipment.....	1,042,078	879,412
Maintenance per mile.....	1,113	956
Conducting transportation.....	3,797,475	3,384,637
Ton miles.:.....	902,745,440	826,069,718
Passenger miles.....	138,591,837	132,887,965

Erie Railroad.—The report of the Erie to June 30 last, emphasizes the special problem under which the administrative management has long labored—the need of a financial plan, which will provide funds for improvement. Results have been secured in the operation of the company that are most creditable. But the officers have had to work with a railroad under-equipped, not well situated to create traffic nor to move it economically, and with no funds available in adequate amount to carry out the improvements which richer neighboring systems have provided so largely in recent years. Nevertheless, the Erie has carried an immense amount of business, held its own in securing its share of the increasing volume of tonnage, and, with all the physical limitations, the officers have secured records of economical operations, which, even without allowance for the conditions out of which they have been produced, have compared favorably with those secured on other trunk lines. The flexibility and alertness of the administration is shown in part by the results in revenue and traffic operations, secured since the suspension of anthracite coal mining on May 12 last. The Erie Railroad in 1901 moved 6,240,000 tons of anthracite coal, or 24 per cent. of the total carried. It is therefore vitally interested in the hard coal output and conditions. In 1902, it lost 237,015 tons, or 3.8 per cent. in tons of hard coal mined, and its loss in ton mileage was probably greater than this. The strike of miners, then, wiped out all the previous gains of the year in hard coal tonnage and revenues, but, despite the losses since May in the hard coal business, the Erie has been able to report a minimum of losses in monthly revenues. The showing is worth setting out in detail, as follows:

	Gross earnings.	Net earnings.
April	*$339,228	*$570,114
May	†320,244	*6,404
June	†304,638	*178,170
July	†333,865	†261,391
August	†179,787	†179,059

*Increase; †decrease.

These changes in earnings are on average monthly revenue of about $3,500,000, and net earnings averaging in excess of $1,000,000. The movement of anthracite coal averages 500,000 tons a month, and gives a train haul of perhaps 125 to 150 miles, or possibly more; and to so nearly make up the loss from the suspension of hard coal mining, and particularly to show improvements in the net returns of recent months is an interesting feature of the current operations. How this result has been obtained is explained in the report in the statement that "during the cessation of operations in the anthracite regions other sources of traffic were developed utilizing the locomotive and car equipment which otherwise would have been idle. The result is shown in the increased tonnage, reducing the loss of revenue caused by a lessened anthracite tonnage." In particular the increase has been due to the larger movement of soft coal and of ore tonnage, the company's officers, so soon as they concluded that a coal miners' strike was inevitable, using every energy to place all their facilities in this and other traffic, for which heretofore they have been hardly competitors, on account of the traffic offering which they were compelled to care for, utilizing all their equipment and transportation facilities. Some of the commodities which enabled the company to report its increase of 1,698,000 tons, or 6½ per cent. in tons moved, are shown in the following statement:

	Tons.	Tons.	Per cent.
Bituminous coal.....	4,999,113	*639,557	14.67
Iron and other ores....	1,959,858	*242,065	14.09
Pig and blooms.....	988,389	*231,822	30.64
Stone, sand, etc.....	929,973	*255,364	37.85
Cement, brick and lime.	572,487	*117,943	25.95
Lumber	1,265,598	*188,946	17.55

*Increase.

But the loss of coal tonnage was not the only adverse factor in Erie's traffic operations last year. Crop and market conditions lowered the tonnage of grain, flour and other mill products, and fruit and vegetables, all long distance traffic, so that, in spite of the increase in the number of tons moved, there was a loss of nearly 56 millions, or 1¾ per cent., in tons of general freight carried one mile, which, with the loss of 177⅓ millions, or 9⅔ per cent. in tons of coal carried one mile, brought the total loss in ton miles up to 233¼ millions, or 4⅔ per cent., and decreased the average train mile haul by over 20 miles, or 10½ per cent.

Obviously, the Erie management would like not only to regain the losses in coal, grain and other general traffic attributable to general conditions of the year, but also to retain the traffic which they were able to develop to partially offset the losses in these classes of tonnage. But with their ordinary traffic so fully testing the transportation facilities of the company this seems pretty nearly impossible. The problem, then, is to find the funds necessary to give the Erie Railroad the facilities to move the tonnage which the operating and traffic departments are assured of handling when they can provide transportation facilities.

The income account on 2,154 miles operated makes the following comparisons:

Earnings:	1902.	1901.	Increase or decrease
General freight.....	$20,955,608	$20,247,910	*$707,697
Coal	9,235,507	9,037,086	*198,421
Passengers	8,075,726	7,278,054	*797,672
Total gross.....	40,894,434	39,102,302	*1,792,131
Expenses:			
Maintenance of way...	3,981,146	4,288,895	†307,749
Maintenance of equip..	5,606,299	6,057,250	†450,951
Conducting transp.....	16,561,647	16,138,787	*422,860
General	999,187	852,647	*146,539
Taxes	1,028,321	1,069,395	†41,074
Total expenses.....	$28,176,600	$28,406,974	†$230,374
P.c. of exp. to gross...	68.9	72.65	†3.75
Net earnings.....	12,717,834	10,695,328	*2,022,506

*Increase; †Decrease.

In 1902 other income, chiefly receipts from the coal properties owned, among which is now included the Pennsylvania Coal Company, was $1,945,207, an increase of $449,000 over 1901, but fixed charges at $10,278,364 were $910,115 higher and the surplus remaining was $4,384,700, or $1,561,521 more than in the previous year. Out of this surplus, 3 per cent. in dividends was paid on the first preferred stock, calling for $1,436,772.

There was charged to capital accounts $1,373,524 for additions and betterments, and $3,200,000 for additional equipment, while $2,610,000 car trusts were issued covering 60 locomotives; 2,000 box and 1,000 gondola cars on which partial payments amounting to $2,458,000 made in 1902, are included in the charge above of $3,200,000 for new equipment. For its construction expenditures, the Erie Railroad received $1,000,000 prior lien and $1,000,000 general mortgage bonds, but the $1,000,000 prior lien bonds are held in the treasury unsold, together with other unpledged securities. Since the present company's organization in December, 1895, there has been charged to capital account $5,811,900 for betterments and $14,098,500 for additional equipment, but these are relatively low charges, considering the needs of the property, or as compared with the improvement expenditures of other trunk lines in the same period.

Changes in traffic statistics are reported below:

	1902.	1901.	Inc. or dec.	P.c.
Tons moved.....	27,679,159	25,999,602	*1,697,557	6.5
Tons, one mile‡...	4,756,340	4,989,582	†233,242	4.7
Passengers carried.	18,597,550	17,209,900	*1,387,650	8.1
Passengers, 1 mile.	524,679,237	469,670,388	*55,008,849	11.7
Freight train miles	12,632,532	13,300,036	†667,504	5.0
Pass. train miles..	8,514,974	8,241,102	*273,872	3.3
Frt. train mile rev.	$2.39	$2.20	*$.19	8.5
Pass. train rev. per train mile.....	1.12	1.05	*.07	6.9
Aver. rev. freight train load.....	3.76	3.75		
Aver. ton mile rev., cts.....	.635	.587	*.048	8.2
Aver. ft. train haul	172	192	†20.2	10.5

*Increase: †decrease; ‡000 omitted.

It will be seen that the train load was maintained, notwithstanding the irregularity of traffic, and the decrease in bulk freight like grain and anthracite coal.

NEW PUBLICATIONS.

Proceedings of the Master Car Builders' Association. Twenty-sixth Annual Convention. June, 1902. Joseph W. Taylor, Secretary, Rookery Building, Chicago. $1.50.

This volume of the proceedings has 560 pages of text, and besides that many folding sheets of drawings. The body of the report contains numerous illustrations and has a good index. As in previous years, it contains a full report of the convention including the papers and reports presented by members and committees, the amended and revised Rules of Interchange, decisions of the Arbitration Committee, standards of the association and other minor transactions connected with the work since the publication of the last volume for 1901. In accordance with the results of letter ballots during the year many of the standards have been revised and the plates in the back of the book brought up to date.

TRADE CATALOGUES.

Brown & Sharpe Mfg. Co., Providence, R. I., illustrate their latest productions in combination squares, protractors and calipers in a small 10 page pamphlet just out. These tools are made with the utmost accuracy and are intended to fulfil all the needs of the machinist in this line. A full description and the various sizes and prices are given for each instrument listed.

The Boston Belting Co. has issued a six-page folder descriptive of its "American Underwriters" fire hose. A large percentage of the mills in this country are insured in companies which come under the jurisdiction of either the Associated Factory Mutual Insurance Companies or the National Fire Protection Association, and are obliged to have fire hose which fully meets the requirements of those organizations. The circular calls attention to the fact that the hose described conforms with the specifications of the insurance organizations named, and that it is recommended and accepted by them.

The Chicago Pneumatic Tool Co. has just issued a pamphlet catalogue descriptive of its pneumatic hoists. This is a new line of geared hoists operated by air motors and were formerly made by the Chisholm & Moore Mfg. Co., Cleveland, Ohio. Half-tones and engravings from line drawings illustrate fully the form and construction of these devices as well as their various applications, which latter include a combination with a trolley, convenient of form and arrangement. Hoist data giving speeds for given loads from actual tests at 80 lbs. air pressure are also included.

Vulcabeston Packing is the title of a small catalogue just issued by the H. W. Johns-Manville Co., New York. The packing is composed of asbestos combined with vulcanized gums, and is claimed to be immune from the action of acids, alkalies and gases. A number of testimonials from railroads are given and it is stated that a certain trunk line had used that brand on the valve stems of one of their heavy express passenger locomotives running over 100,000 miles without even screwing down the follower.

"*Packing Sense*" is the title of a little pamphlet just issued by the United States Metallic Packing Co., Philadelphia, Pa. It shows the way to adjust and take care of packings made by the company.

The J. G. Brill Co., Philadelphia, Pa., in a pamphlet dated October, 1902, illustrate three of their most advanced types of large electric cars. The first one, the semi-convertible car, is designed to provide a closed car for stormy weather and a partially open car for summer service. The convertible type, by the drawing down

of the side panels from pockets under the roof is quickly changed from the usual form of open car, into a perfectly weatherproof closed car suitable for service in the worst weather. The third type, the "Narragansett," is a large open car with double trucks suitable for summer excursion business. The unique feature of this car is the double step, formed by the Z-iron sill in combination with the usual single step. While not encroaching on the clearance width the bottom step may be brought closer to the ground, facilitating comfort in taking on and discharging passengers. All of these cars are suitable for surface lines in cities yet are amply strong and commodious for the most exacting suburban service under high-speed conditions.

Messrs. Dick, Kerr & Co., Ltd., London, have lately issued a set of illustrated pamphlets, one of which is descriptive of the "English Electric Manufacturing Company," Preston, Lancaster. The opening sentence in the descriptive matter states that the policy of this company is modeled much after American practice. The main shop building is 900 ft. long and 120 ft. wide. Another pamphlet deals with the "Continuous Current Generators" built by the above-mentioned company at their Preston Works. The engravings are exceptionally good, as is the descriptive matter. Another pamphlet entitled "Electric Traction at the Cape" describes in detail the Camps Bay, Cape Town & Sea Point tramway, recently designed and built by Messrs. Dick, Kerr & Co. The entire work was carried on during the progress of the Boer war. The railroad is nine miles long, and contains severe grades, many being 8⅓ per cent. "Rolling Stock for Electric Traction" is the subject of another pamphlet. Herein are described the several types of electric cars used over the greater part of England and in many of the colonies. The varieties shown have become standardized at the works of the Electric Railway & Tramway Carriage Co., Preston, Lancaster. One of the improvements shown is the introduction of the Bellamy reversed stairway for the double-decked cars. The results of recent high acceleration tests on the Liverpool Overhead Railway Company, with a general discussion of electric traction on railways, is the subject of another pamphlet. The data given herein are of unusual interest and will be printed in another issue of the *Railroad Gazette*.

TECHNICAL

Manufacturing and Business.

Ernst Wiener, Manager of Arthur Koppel, 66-68 Broad street, New York, returned last week from an extensive business trip in Europe.

The Jordan Railway Joint & Nut Lock Mfg. Co. has been incorporated with $60,000 capital by Thomas P. Magrane, William W. Howe and P. A. Hines, of Chicago.

The large business of the Chicago Pneumatic Tool Co. in the southwest has necessitated the appointment of a representative to look after that territory. Accordingly W. C. Walker has been located at St. Louis, Mo., his office being at 325 Lincoln Trust Building.

The new machine shops of the Union Pacific at Omaha, Neb., have been put into commission. These shops are electrically equipped throughout and have a modern central power plant. The Arnold Electric Power Station Co., Chicago, were the Consulting Engineers.

The Converse Bridge Co. at Ridgedale, just outside of the city of Chattanooga, Tenn., is about finishing a large addition to its plant. The company's facilities have been overtaxed and it has been found necessary to install considerable new machinery. It has also greatly enlarged its power house.

The American Car & Foundry Co. has declared its regular quarterly dividend of 1¾ per cent. on the preferred stock, and one-half of 1 per cent. on the common stock. The net earnings of the company for four months ended Aug. 31 were $2,322,000 against $1,086,864 for the corresponding period last year.

The Kinnear Mfg. Co., Columbus, Ohio, has got out an interesting little advertising novelty designed to show the application of the Kinnear steel rolling door to a car house. The operation of the device, in illustrating this application, is something of a puzzle and some study is required to discover its modus operandi.

The Improved Rail Joint Co. has filed articles of incorporation with the County Clerk at Rochester, N. Y., showing a capital stock of $300,000. The object of the company is to make a rail joint designed by Patrick E. Gavin. Among those interested are Thomas J. Nicholl, General Manager of the Rochester Ry. Co.; Walter J. Baker, of Rochester, and Frank Kane, of Buffalo.

A. E. Harper has been appointed Vice-President and General Manager of the Manufacturers Coal & Coke Co., with headquarters at Connelsville, Mo. He will have jurisdiction over development, construction and operation. Mr. Harper has been Fuel Agent of the Illinois Steel Co. for 12 years, and has filled the same position with the United States Steel Corporation since its formation.

Articles of incorporation have been filed in Arizona by the Lawrence Switch Company, with principal places of business at Prescott, Ariz., and at Duluth, Minn. The company will own, buy and deal in railroad switches and other railroad appliances, operate and equip iron and steel works, etc. The capital stock of the company is $1,000,000. The directors are: Wm. A. McGonagle, T. W. Hugo, J. F. McCarthy, W. E. Lawrence, H. H. McNamara, Carroll Corson and Henry S. Mahon.

The statement of earnings of the Chicago Pneumatic Tool Co. for the nine months ended Sept. 30 show the total sales to have amounted to $1,474,797. The net earnings, after depreciation, were $541,813. The dividends paid in this period were 2 per cent. on April 15, 2 per cent. July 15, and a third dividend of 2 per cent. has been declared and is payable Oct. 15. To show the growth of the business it is well to say that the total sales of pneumatic tools for the year 1901 were $964,004.

W. E. Caldwell Company, Louisville, Ky., is 30 days behind with its orders for water tanks and towers. On an average, the company is sending out 30 tank and tower jobs a month. These tanks on towers are used for fire protection by industrial plants, for water supply in villages and small towns and for private parties. Besides these, upward of 200 tanks a month are sent out. This output calls for about 3,000,000 ft. of lumber, most of which is Louisiana cypress and Georgia pine, and 300 tons of steel bands a year.

The Standard Pole & Tie Co., New York, which has been for some 12 years making poles for telegraph and telephone work, has lately started a large saw and cross arm mill at Brooksville, Fla., where it owns a big tract of heart-pine timber land. Previously, in addition to telegraph and telephone poles, cross arms, ties, octagonal and square pine poles and also round juniper (southern white cedar) poles were made. With the acquisition of this Florida tract and the building of the mill, it is expected to add to this list car sills 40 to 60 ft. long, also square or chamfered poles for bridge or block signals. This timber will also enable them to supply yellow pine ties. An expert corps of inspectors examines and stamps each piece before shipment, which should insure excellence of material. The main office is at 44 Broad street, New York, with branches at Maxton, N. C., and Brooksville, Fla.

Iron and Steel.

The Franklin Trust Co. has been appointed receiver for the Grant Tool Co., of Franklin, Pa. The assets are said to be $550,000; liabilities, $230,000.

The Southwestern Bridge & Iron Co., of Enid, Okla. T., has been incorporated with $100,000 capital. Geo. H. Bradford and Edward Miles are incorporators.

The Chesapeake Iron Works, of Baltimore, Md., has been incorporated by Chas. L. Applegarth, John Burnburg, John G. Doan and others, of Baltimore. It will make bolts, nuts and machinery.

The Cohen-Schwartz Rail & Steel Co. has been incorporated in Missouri, with $44,000 capital stock. S. Schwartz, H. Cohen, A. Cohen and B. Grossberg are incorporators. The office will be in St. Louis.

P. T. Berry, for many years Chief Mechanical Engineer of the Homestead Steel Works, and Consulting Mechanical Engineer for the Carnegie Steel Co., has resigned on account of ill health and has sailed for Sweden.

A despatch from Berlin says the rolled steel syndicate has reduced prices in Germany by $1.25 a ton, probably as a concession to public opinion, as there has been much agitation recently over the high domestic and low export prices.

The Scully Steel & Iron Co. of Chicago has increased its capital stock from $25,000 to $1,000,000. The company began business in 1891, and the increase in capital stock now made represents the earning capacity of the company based upon the growth of business during the past 10 years.

The stockholders of the Jones & Laughlins Steel Co. have decided to issue bonds to the amount of $10,000,000. At the reorganization of the company this bond issue was provided for and this recent action is the ratification. The company contemplates improvements which will increase the capacity of the plant to 1,200,000 tons of steel annually.

Pneumatic Tool Litigation.

Upon the application of the Chicago Pneumatic Tool Company, Judge Lacombe granted, on Oct. 13, an injunction against the Philadelphia Pneumatic Tool Company. A statement of the proceedings heretofore in this case was published in these columns last week. The effect of this injunction is that the Philadelphia company is forbidden to sell anywhere in the United States the drill which has been decided to be an infringement of the Moffet patent, owned by the Chicago Pneumatic Tool Company.

Baltimore & Ohio Shops.

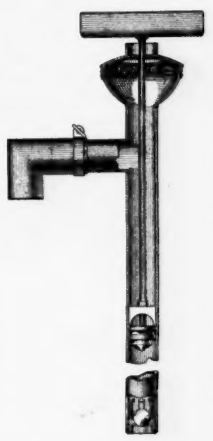
The Baltimore & Ohio is said to have approved plans for extensive shop improvements, in addition to those recently authorized. More buildings are to be put up at Glenwood, Pa.; Painesville, Ohio; Holloway, Ohio, and at Keyser, W. Va. The plans for the Holloway and Painesville shops provide for roundhouses of 23 stalls, the inner diameter being 200 ft., and the outside diameter 382 ft. Each will have an 80-ft. turn-table and an oil and store house of brick, one-story high and 30 x 150 ft. The other buildings include a carpenter shop, machine shop and coaling station. It is said contracts are to be let shortly. The roundhouse at Keyser will have 25 stalls. The total cost of the work at Keyser will probably reach $450,000.

Rails From Europe.

Arthur Koppel (66 to 68 Broad street, New York,) has received an order from the Southern Pacific Railway for 15,000 tons of rails, 80 lbs., Am. Soc. C. E. section. These rails are to be delivered within the next two months. This firm is receiving many large contracts for railroad equipment.

The Sterrett Oil Pump.

A new pump, particularly designed to handle heavy oils, has been patented by Mr. Frank O. Sterrett of St. Paul, who endeavored to provide not only forms of valves that will permit heavy oils, even when cold and stiff, to pass through readily, but also to prevent, by use of a peculiar form of stuffing box, the oil from being carried up the stem of the plunger and spilled or smeared over the outside of the pump or other objects.



In the bottom of the tube is a ball valve, consisting of a seat screwed into the end of the tube and having an opening wherein is seated a ball; vertical arms permit the ball to rise and fall without leaving the vicinity of the seat. The plunger has a cylindrical portion to fit the tube, an annular groove in the periphery of which fills with oil and serves to make a tight-working joint; the vertical part acts merely as a guide to keep the valve in position. The stem carries at its end a tapered block, on which rests a seat of the same taper. This block is also tapered on the bottom so as to form less resistance to the oil as the valve descends. Another distinguishing feature of this pump is in the top of the tube, this being flared to form a head to which a cap is screwed, making a guide for the stem. Depending within this cover and surrounding the stem is a chamber with an annular wall and fitted with a cap; within this chamber a metal washer and other suitable packing material are placed. It is claimed that in addition to the cleanliness it insures, this pump is easy to work and will deliver a quart at each full stroke; also that it will handle anything from water to molasses with equal ease. It is made of seamless brass tubing. The Sterrett Pump Co., St. Paul, Minn., is the maker.

Electrical Apparatus in English Coal Mines.

It has been estimated that 500 years will see the end of England's coal supply. That event is too far ahead to trouble the miner of to-day, but even now mining has become difficult and costly and operators have been forced to work the thinner veins of coal. This fact has stirred up the British operator, and recently contracts have been given to the Westinghouse Electric & Manufacturing Company by a number of colliers to equip their mines with electrical apparatus. These contracts have aggregated about 6,500 h.p. The largest installation given to the Westinghouse Company is that of the Staveley Coal & Iron Company, of Chesterfield. Their equipment will aggregate 4,000 h.p. The next largest contract is that of the Sneyd Colliery, at Burlem. This consists of complete alternating current equipment, induction motors being used for driving the rope hauling engines, pumps and other auxiliary apparatus. The use of induction motors was here made necessary owing to the fact that the mines are gaseous, and direct current machinery would have been dangerous owing to the sparking of the moving contacts.

Washington-Baltimore Single Phase Railroad.

Two weeks ago we printed a long account of this interesting work. In that account the statement was made that "The type of motor to be used was proposed to the Cleveland Engineering Company, representing the Washington, Baltimore & Annapolis Railway, and after investigation by their engineers it was adopted." We are now informed that the work was done by the Cleveland Construction Company. We are glad to make this correction, although the error was not our own.

N. & W. Bridge at Chillicothe.

In the course of strengthening the bridges on the line of the Norfolk & Western, the company is replacing the bridge at Chillicothe, Ohio, over the Scioto River. This consists of two trusses 124 ft. center to center each, one 145 ft. span center to center, and 456 ft. of steel viaduct.

Wabash Shops.

The Wabash is contemplating spending a large amount of money for car and locomotive shops, and Mr. Ramsey's visit to Toledo last week is said to have been in connection with this proposed work. In the last annual report of the company Mr. Ramsey said that, "excepting the shops at Moberly, the company has no shops, locomotive or car, worthy of the name. The engine shops at Springfield and Fort Wayne and the car shops at Decatur and Toledo are no larger than they were 25 to 30 years ago, and most of the machinery is old and obsolete and incapable of doing the heavy work on the large engines now in use. The shops are too small and located where ground cannot be secured for enlargements. We must, therefore, at once arrange for new shops for both the Middle and Eastern Divisions. This will require within the next two years between $400,000 and $500,000."

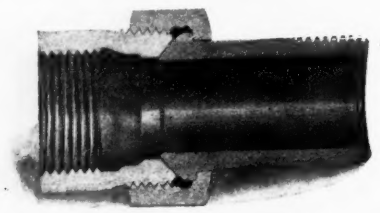
Charleston Dry Dock.

Bids were opened at the Navy Department, Oct. 11, for

concrete and granite dry dock No. 1 at the Charleston, S. C., Navy Yard. The lowest straight bid was that of the Virginia Engineering & Construction Company, of Richmond, Va., which offered to complete the work for $1,189,450. There were seven bidders for the work on Government plans. Each submitted in addition proposals to do the work on his own plans, modifying some of the details of construction. The limit of cost was set as $1,200,000. The remaining six straight bids were as follows: Southern Engineering & Contracting Co., Charleston, S. C., $1,213,500; New York Continental Jewell Filtration Co., New York City, $1,224,617; Norcross Bros. Co., Worcester, Mass., $1,320,000; P. J. Carlin & Co., Brooklyn, N. Y., $1,320,981; John Peirce, New York City, $1,406,924, and H. E. Talbott & Co., Dayton, Ohio, $1,613,000.

The Kewanee Union.

One of the interesting exhibits at the Saratoga Conventions was a case of "Famous" pipe unions, made by the Western Tube Co., Kewanee, Ill. There are two features of especial interest in the construction of these fittings, one being the employment of two dissimilar metals to form the joint and the other the elimination of the usual gasket. This latter is accomplished by the use of a



ground joint of spherical form, one particular point of merit possessed by it being the possibility of having a tight joint even though the alignment of the pipe be imperfect. The two metals composing the union are brass and iron, the first of which is the more sensitive to varying temperatures. It is therefore confined by the malleable iron ring, which if screwed on to it at normal temperature will, of course, remain secure under increased temperature. A moment's consideration will also suggest the fact that both the screw and spherical joint are non-corrosive. The considerable advantage of this point can best be appreciated after an experience with corroded joints wherein the destruction and renewal of the unions has been necessitated when disconnection was desired. The male and female union shown is designed for close work and for decreasing the number of joints.

C., N. O. & T. P. Bridges.

In the annual report of the Cincinnati, New Orleans & Texas Pacific, President Samuel Spencer says that the bridges of the entire line require extensive renewals to admit of the use of heavier locomotives, and it is estimated that the cost of this improvement at present prices, will aggregate about $3,500,000. This expenditure must, of course, be spread over a series of years in order to secure economical results of operation. The work should be begun at once and continued as rapidly as the earnings will permit. Plans with this in view are now under consideration.

THE SCRAP HEAP.

Traffic Notes.

A Chicago press despatch says that the principal roads leading to the Southwest—the Atchison, the Rock Island, the Missouri Pacific and the 'Frisco—have formed a committee to establish a joint colonization bureau.

The Norfolk & Western has petitioned the Governors of Virginia and North Carolina to allow the running of coal trains on Sunday, for the purpose of more rapidly relieving the bituminous coal famine at Norfolk and elsewhere.

A number of railroads have lately notified their ticket agents to require signatures to "iron clad" tickets to be written with ink from the office inkstands. Scalpers have been furnishing ticket buyers with fountain pens containing inks which soon disappear, or can easily be washed off.

The Arkansas Car Service Association has been established, with headquarters at Little Rock. Two days' free time is allowed on all commodities except coal, and on coal three days. The Manager is Mr. F. S. Strite, who has been with the Central Car Service Association at St. Louis for the past seven years.

Reports which apparently have considerable foundation indicate that the Chicago, Milwaukee & St. Paul has made traffic contracts with the Union Pacific, giving the St. Paul more favorable divisions on through traffic to and from the Pacific Coast, and putting it on an equal footing with the most favored eastern connection.

Pittsburgh papers say that the Pennsylvania has issued embargoes on the shipment of produce, especially apples and potatoes, also on scrap iron and certain other commodities, from points west of Pittsburgh to that city. The yards at Pittsburgh are very much crowded, and it appears that these embargoes were maintained for a week or 10 days.

The railroads centering in Washington, D. C., took action in the District Supreme Court last week to enjoin 33 ticket brokers of that city from dealing in the return portions of G. A. R. excursion tickets, and it is said that the court granted the prayer of the petitioners. This action did not come, however, until after the encampment had closed; therefore it will affect only those tickets on which the time has been extended.

The hearing of the freight rate injunction suits in the United States Court at Chicago, which was to have been held this week, has been postponed to Nov. 10, the attorney for the Government having requested the delay because he had other important business to attend to.

The Railroad Commissioners of Illinois have adjourned for several weeks their inquiry into the general subject of freight rates in that State, which inquiry was begun on the application of important mercantile interests. To the application of the Quincy Freight Bureau for reduced rates, which was before the Commission, the Chicago, Burlington & Quincy has filed an elaborate reply, setting forth that its rates in Illinois are now reasonable, that any reduction would necessitate an advance in a number of commodity tariffs by which Quincy and other cities now get a large volume of freight at rates much below the legal maximum, and that the cost of railroad service since 1891, with which year the complainants make comparisons, has increased.

The steamship line which is to make regular sailings between Boston, Mass., and Manchester, England, under the arrangement made by the New York, New Haven & Hartford Railroad for the promotion of export trade from Boston, the International Mercantile Marine Company, is expected to begin operations about the first of next year. The vessels will have a cargo capacity of 8,000 tons, and they will have accommodations for cattle and for dressed beef.

The New York, New Haven & Hartford has withdrawn its "50-cent boat" between Providence and New York, and the Joy Line has raised the fare between these cities from $1 to $1.25, with no reduction hereafter for round trips. These changes were announced at the same time and it was reported that the New Haven Company had bought out its rival or, at least, had made some agreement; but the officers of the Joy Line say that the relations of the two companies have not been changed and that the increase in fares is the result of the higher cost of coal.

The Strike.

At a recent dinner of the Chicago Society in New York some wise words were spoken about the strike. Mr. Gage (lately Secretary of the Treasury) said: "The question of the future of Chicago is akin to that of all the other cities of our land. It depends on the recognition of the natural right of man to freedom of thought and action. It looks now to thoughtful men as if we had come to a period of lawlessness where ignorance has seized the reins of power. We now face, in my opinion, the gravest situation ever known in the history of our country. The pressing question is whether the fundamental right of man to full freedom is to be retained or trodden ruthlessly underfoot by a brutal mob. We must preserve and defend this right, or the liberty which has been our glory and our hope for a hundred years will pass away like a lessening vision or a simple dream." Dr. Hillis said: "Mr. Gage referred to the foundation stones of our national liberty, and I am reminded of what a Chicagoan, Fisher Ames, once said. He declared that the best he could wish for a boy was a free school, a free paper and a free church, and in manhood the right to work freely wherever he wished. If to obtain this right to work freely a row of soldiers was needed, then, he said, let the row be a long one."

Train Speeds in Russia.

The Moscow people have been urging that the speed of an express train from Moscow to Brest (on the way to Vienna) be increased to 40 miles an hour, it being now 33 miles. Their requests reached the government and the proper department made inquiry of the railroad management whether the speed could be increased. It is said to have received the following reply: 1. Before running at such speed the whole track must be relaid with heavy rails. 2. It will take four years and cost $10,000,000 to do this. (It is 680 miles from Moscow to Brest, whence it appears that the cost of putting rails in the track is estimated at something over $100 per ton.) 3. Until heavier rails are put in not only will it be impossible to increase the speed of the express, but it must be reduced to 29 miles an hour.

A Canal, Norfolk to Beaufort.

The Secretary of War has approved a project recommended by Brig. Gen. Gillespie, Chief of Engineers, U. S. Army, for a survey between Norfolk, Va., and Beaufort, N. C., to determine the most advantageous route for an inland water way to be built by the Government between those places.

The Floating Dry Dock at Havana.

Naval Constructor D. W. Taylor, U. S. Navy, who was sent to Havana by the Navy Department to investigate the injury to the steel floating dry dock which recently collapsed during the self-docking of two pontoons, reports that the dock can be repaired afloat and put in condition to be towed for about $1,000. No estimate is given of the cost to repair the dock which the Navy Department may have towed to Pensacola, Fla., for repairs.

Traffic with Mexico.

The Mexican Treasury Department has published data as to railroad traffic across the Rio Grande frontier between Mexico and the United States which shows that in March, 1902, the aggregate for the four custom houses of Ciudad Juarez, Ciudad Porfirio Diaz, Laredo and Nogales was as follows: Cars entering Mexico from the United States, 3,585, carrying 50,656 tons of merchandise; cars leaving Mexico for the United States, 937, with 5,724 tons of freight; total number of cars both ways, 4,522; total tonnage of freight, both ways, 56,380. Comparing these figures with those of a year previous, the result shows an increase of 348 cars, but a decrease of 8,918 tons of merchandise.

American Franchise in Poland.

According to a despatch from London, the Minister of Finance has been petitioned by a syndicate of American capitalists for a concession to build an electric railroad between Warsaw and Lodz, Poland, a distance of about 75 miles. The names of interested parties are not stated.

Oil Fuel for Naval Use.

For about three months a board of Naval engineers has been making practical tests with various oil burners and a 2,000 h.p. Marine boiler at Washington. A preliminary report has been prepared which is understood to show that out of 14 different devices presented for test by American inventors, no one would burn coal oil under a marine boiler and produce steam in competition with coal, even if oil were sold at a dollar a barrel.

The G. A. R. Traffic to Washington.

Preliminary estimates made last week of the number of passengers carried to Washington by the railroads during the first five days of the G. A. R. encampment Oct. 6-11, showed the number to have been about 200,000. On one evening over 65,000 persons were landed at the Pennsylvania station, and the railroad officers estimate that about 120,000 persons went to Washington on long distance tickets and about 80,000 from nearby points. During the first three days over 10,000 applications were made for extensions of time on return tickets. All the railroads entering the city had all the traffic they could handle, and most through trains were about 11 hours late, but the crowds were handled without accident of any kind.

The Trans-Australian Railroad.

The South Australian Premier has agreed to submit to Parliament during the present session a motion affirming the desirability of constructing the Adelaide-Port Darwin direct trans-continental railroad on the land-grant system, completing the gap of 1,063 miles between Oodnadatta and Pine Creek. Capitalists, contractors, and others interested in the project are invited to closely watch the progress of the measure through the South Australian Parliament.

Train Robbers Near Lincoln, Neb.

On the morning of Oct. 11, about two o'clock, an express train of the Chicago, Burlington & Quincy was stopped by three robbers four miles from Lincoln, Neb., and the express car was wrecked by dynamite. It is said that the robbers secured several thousand dollars in money.

Restoration of Wood-Burners in North Carolina.

The Atlantic Coast Line and the Seaboard Air Line are changing a considerable number of locomotives from coal burning to wood burning, in consequence of the short supply of bituminous coal. It is said that on one of these roads the supply of coal ran so short last week that some tenders of freight engines were emptied to supply passenger engines. Reports state that on the Atlantic Coast Line wood will be used on the less important trains, passenger trains and through freights being continued with coal. The engines on the Carolina Central Division of the Seaboard Air Line will all be changed to burn wood.

The Fritz Dinner.

The committee in charge of the celebration of the birthday of Mr. John Fritz and of the founding of the John Fritz medal request us to call attention to the fact that it is desirable for people who wish seats to notify the committee as soon as they can. Late comers seriously complicate the matter of seating the guests for a company so large. We are requested also to say that the price of the dinner ticket includes wine and cigars. It seems that inquiries about this have been made. It will be remembered that the dinner takes place Oct. 31.

Wireless Telegraphic Communication With a Moving Train.

On the special train of the Grand Trunk Railway which carried the western general passenger agents to their annual convention at Portland, Me., last Monday, there was an experimental apparatus for communicating with the station at St. Dominique by wireless telegraph, and communication was successfully established. The experiment was conducted by men from McGill University, Montreal, and it was readily carried out while the train was running at high speed. Communication was kept up from a point eight miles west of St. Dominique to eight miles east of the station.

LOCOMOTIVE BUILDING.

The International & Great Northern will order about 40 locomotives.

The Rio Grande Western is asking prices on a few passenger locomotives.

The Chesapeake & Ohio has ordered 25 locomotives from the American Locomotive Co.

The St. Louis & North Arkansas are having two locomotives built at the Baldwin Works.

Swift & Co. are having a locomotive built at the Schenectady Works of the American Locomotive Co.

The Colorado & Southern, according to press reports, has recently placed an order for 32 locomotives.

The Chicago & Alton has ordered two small locomotives of the Pacific type from the Baldwin Works.

The Grand Rapids & Indiana is having six locomotives built at the Altoona shops of the Pennsylvania R. R.

The Alabama Great Southern is having two locomotives built at the Baldwin Works, in addition to recent orders.

The Norfolk & Western, according to local press reports, desires to buy or hire for immediate use a number of engines.

The Northern Pacific is having 20 of the 50 locomotives ordered last August from the American Locomotive Co., built at the Schenectady Works.

The Central of New Jersey has ordered 40 locomotives, 25 of which will be built by the American Locomotive Co., and the remainder at the Baldwin Works.

The New York Central & Hudson River is having 15 of the 45 locomotives ordered last year from the American Locomotive Co., built at Schenectady, and 15 at the Cooke Works.

The Chicago, St. Paul, Minneapolis & Omaha, as reported in our issue of Oct. 10, has ordered 20 locomotives from the American Locomotive Co., 15 simple 10-wheel engines, for July and August, 1903, delivery, and five simple "St. Paul" passenger engines, for May, 1903, delivery. The simple 10-wheel engines will weigh 164,000 lbs., with 129,000 lbs. on the drivers, and have 21 x 26 in. cylinders, 63 in. drivers, extended wagon top boilers, with a working steam pressure of 200 lbs.; 342 charcoal iron tubes; 2 in. outside diameter, 16 ft. long; wide firebox of carbon steel 102⅛ in. long and 65¼ in. wide; tank capacity 5,400 gallons of water and 10 tons of coal. The passenger engines will weigh 192,000 lbs., with 130,000 lbs. on the drivers, and have 21 x 28 in. cylinders, 75 in. drivers, extended wagon top boilers, with a working steam pressure of 200 lbs.; 275 charcoal iron tubes, 2¼ in. outside diameter, 20 ft. long; wide fire-box of carbon steel 90 in. long and 75 in. wide; tank capacity 6,000 gallons of water and 10 tons of coal. The special equipment for both classes includes: Westinghouse American air-brakes; hammered steel axles; Company's standard bell ringers; Franklin sectional boiler lagging; Sterlingworth-Morden brake-beams; Corning brake-shoes; Chicago couplers; Company's headlights; Monitor injectors; Jerome piston and valve rod packings; Ashton muffled safety valves; Leach sanding devices; Nathan sight-feed lubricators; springs made by the Scott Spring Co.; Ashton steam gages, and Company's steam heat equipment.

The Delaware & Hudson has ordered 16 simple consolidations, four 10-wheelers, six eight-wheelers and 14 six-wheel switching engines from the American Locomotive Co. The consolidations will weigh on drivers 164,000 lbs.; total weight, 187,000 lbs.; cylinders, 21 x 30 in.; diameter of drivers over tires, 57 in.; Culm boilers, 73

in. in diameter at smallest ring, with 190 lbs. pressure, and heating surface of 3,408 sq. ft.; tubes, 411 in number, of charcoal iron, 11 ft. ½ in. long and 2 in. outside diameter; fire-box 120⅜ in. long, 108⅛ in. wide; grate area, 90.2 sq. ft.; tank capacity, 6,000 gallons; capacity for coal, eight tons; journals, 9 x 11 in. Special equipment includes Richardson valves, Midvale tires and steel-tired tender wheels.

The eight-wheelers will weigh on drivers 92,000 lbs.; total weight, 135,000 lbs.; cylinders, 20 x 24 in.; diameter of drivers, 69 in. over tires; type of boiler, Culm, 62 in. in diameter at the smallest ring, with wide fire-boxes and working steam pressure of 190 lbs.; total heating surface, 2,500 sq. ft.; number of tubes, 297 of charcoal iron, 2 in. in diameter, 13 ft. 1½ in. long; fire-box, 120 in. long and 96 in. wide; grate area, 79.8 sq. ft.; tank capacity, 6,000 gal.; coal capacity, eight tons; main journals, 10 x 12 in.; back journals, 9 x 12 in.; steel tires on tender wheels.

The 10-wheelers will weigh on drivers 128,000 lbs.; total weight, 170,000 lbs.; cylinders, 21 x 26 in.; diameter of drivers, 72 in. over tires; Culm boilers, with wide fire-box and working steam pressure of 200 lbs.; total heating surface, 2,900 sq. ft.; 306 tubes of charcoal iron, 2 in. in diameter; fire-box 121 in. long and 102¾ in. wide.; grate area, 35.4 sq. ft.; tank capacity, 6,500 gal.; coal capacity, 10 tons; diameter of boiler, 65 in. at smallest ring; journals 10 in. x 12 in.; steel-tired tender wheels.

The switchers will weigh 138,000 lbs., all on the drivers; cylinders, 19 x 24 in.; diameter of drivers, 51 in. over tire; Culm boilers, 62 in. in diameter at smallest ring, with wide fire-box and working steam pressure of 180 lbs.; total heating surface, 1,800 sq. ft.; 269 tubes of Shelby steel, 2 in. in diameter and 11 ft. 5¼ in. long; fire-box 107 in. long and 96¾ in. wide; tank capacity for water, 4,200 gal.; coal capacity, eight tons. Special equipment for all four classes of locomotives includes Westinghouse brakes, Cambria Steel axles, Sansom bell ringers, Keasbey & Mattison magnesia sectional boiler lagging, Diamond "S" brake-shoes, Trojan couplers, Dressel headlights, Hancock composite inspirator injectors, Cypress metal journal bearings, U. S. metallic multi-angular piston and valve rod packing, consolidated safety valve, Leach sanding devices, Nathan sight feed lubricators, National springs and Midvale tires. The switchers will have cast-iron tender wheel tires and Wilson American high-pressure balanced valves.

CAR BUILDING.

The Southern is in the market for new passenger cars.

The Michigan Central is asking prices on 500 gondola cars.

The Seaboard Air Line is in the market for about 1,000 box cars.

The Missouri Pacific is in the market for new passenger cars.

The Wabash is reported to be in the market for new passenger cars.

The Lake Shore & Michigan Southern is asking prices on 10 baggage cars.

The St. Louis & San Francisco is in the market for new passenger cars.

The Great Northern has ordered 2,500 freight cars from Haskell & Barker.

The Peerless Cement Co., Boston, Mass., is asking prices on 20 hopper cars.

The Cornwall & Lebanon is having 50 freights built by the Pressed Steel Car Co.

The Chicago & North Western has ordered 3,000 freight cars from Haskell & Barker.

The International & Great Northern is reported to be in the market for freight cars.

The Vera Cruz & Pacific has ordered 50 box cars from the American Car & Foundry Co.

The Philadelphia & Reading has ordered 30 passenger cars from Osgood Bradley & Son.

The Illinois Central has ordered 1,000 box cars from the American Car & Foundry Co.

The Southern Iron Car Line is having 100 freights built by the Georgia Car Manufacturing Co.

The Evansville & Terre Haute is figuring on purchasing about 200 coal cars of 80,000 lbs. capacity.

The St. Louis & North Arkansas has ordered two coaches from the American Car & Foundry Co.

The New York, Ontario & Western is asking bids on six coaches and two drawing room cars of its standard design.

The New Orleans & Northeastern (Queen & Crescent) is having 30 freights built by the American Car & Foundry Co.

The Chicago, Burlington & Quincy is receiving bids on 40 coaches and 50 chair cars, 70 ft. long over end sills, and 9 ft. 8 in. wide.

The Mather Stock Car Co. is having 10 freights built at the South Baltimore Car Works, in addition to the order reported last September.

The Canadian Pacific has ordered the 14 passenger cars for which it was reported in the market in our issue of Sept. 19, from the Pullman Company.

The New York, New Haven & Hartford denies having placed any recent order for box cars and says that it is not in the market for more at the present time.

The New York Central & Hudson River, in addition to the order reported in our issue of Oct. 3, is having eight freights built by the Russell Wheel & Foundry Co., Detroit, Mich.

The Chicago, Peoria & St. Louis is in the market for 200 coal cars of 80,000 lbs. capacity, to be built of wood, with wooden underframes 36 ft. long. Further details of specifications have not yet been decided.

The Lake Erie, Alliance & Wheeling has not yet decided upon the details of the specifications desired for the 500 coal cars for which prices are being asked. In general, what is wanted is a standard wooden car of 80,000 lbs. capacity.

The Copper Range is having six coaches, 30 ore cars, 20 41-ft. flat cars, five 41-ft. gondolas and 10 box cars of 60,000 lbs. capacity built by the American Car & Foundry Co. This includes the order reported in our issue of Oct. 10.

The Colorado & Southern, on Sept. 27, placed orders with the American Car & Foundry Co. for the following cars: Two hundred and fifty 40-ton Ingoldsby dump coal cars, 150 40-ton steel Ingoldsby coke cars, and 150 30-ton box cars, and on Oct. 4 placed an order with the same company for 200 stock cars for the Ft. Wayne & Denver.

The Southern Pacific, as reported in our issue of Oct. 3, is asking prices on 1,600 box cars of 80,000 lbs. capacity with steel underframes; 1,000 flat cars of 80,000 lbs. capacity with steel underframes; 500 stock cars with steel underframes; 100 chair cars and 75 refrigerator cars. None of these orders have been placed. Bids are to cover both pressed and structural steel.

The Minneapolis, St. Paul & Sault Ste. Marie has ordered 200 flat cars from the American Car & Foundry Co. of 60,000 lbs. capacity. The cars will weigh 24,400 lbs., and measure 36 ft. long and 8 ft. 2 in. wide over sills, built of wood, with wooden underframes. The special equipment includes: Iron axles; Common Sense bolsters; Damascus brake-beams; Congdon brake-shoes; Westinghouse air-brakes; Washburn couplers; Butler tandem drawbar attachment draft rigging; McCord journal boxes and lids; metal trucks and 33 in. cast-iron American Car & Foundry Co.'s wheels.

The Duluth, Missabe & Northern, as reported in our issue of Oct. 10, has ordered 400 steel ore cars, 350 from the Pressed Steel Car Co. and 50 from the American Car & Foundry Co., for March, 1903, delivery. The cars will weigh 33,000 lbs., and measure 24 ft. long between couplers, 8 ft. 6 in. wide and 9 ft. high, with steel underframes. The special equipment includes: Open hearth steel axles; pressed steel and cast-steel bolsters; pressed steel brake-beams; cast-iron brake-shoes; Westinghouse air-brakes; standard brasses; Chicago M. C. B. couplers; Westinghouse friction draft rigging on 200 cars and Bryan draft rigging on the balance; McCord journal boxes and lids; Mineral paint; standard coil springs, pressed steel and cast-steel trucks and cast-iron wheels.

The Chicago, St. Paul, Minneapolis & Omaha, as reported in our issue of Oct. 3, has ordered nine coaches and one chair car from the Pullman Co., for February, 1903, delivery. The coaches will weigh 72,000 lbs., and measure 63 ft. 6½ in. long; the chair car measures 77 ft. 10 in. long; both coaches and chair car are 10 ft. ¼ in. wide and 14 ft. 7 in. high over all. The special equipment for both includes: M. C. B. axles; double bolsters; "Diamond" special brake-beams; Christie cast-iron brake-shoes; Westinghouse high-speed air-brakes; M. C. B. lead lined brasses, Chicago steel passenger type couplers; Forsyth roller tip curtain fixtures; Pantasote curtains; M. C. B. Railway standard journal boxes; Pintsch gas light; C. & N. W. standard paint; Standard Steel type "A" platforms; Pullman standard roofs; A. French Co.'s springs; Pullman standard trucks and wide vestibules, and National No. 6 wheels.

BRIDGE BUILDING.

AKRON, OHIO.—The Council has taken up the matter of building a viaduct across the railroad tracks on Mill street, but a new resolution just introduced proposes that it be built on Exchange street.

AMHERST, MASS.—The Amherst & Sunderland R. R. is considering building a bridge over Mill River.

ARKADELPHIA, ARK.—We are told that the Levying Court has authorized a steel bridge over Ouachita River at Arkadelphia.

BIRMINGHAM, ALA.—The County Commissioners of Walker County want bids until Nov. 5 for a steel bridge over Cane Creek at Cordova. J. W. Shepherd, Judge of Probate.

BOISE, IDAHO.—R. W. Faris will prepare plans and specifications for the proposed bridge across Snake River, to be built by the projectors of the big power and irrigation project at Twin Falls. The bridge will be steel suspension, with a span of 126 ft. The approach on one side is 90 ft. and on the other 40 ft.

BOSTON, MASS.—The City Engineer on Oct. 8, opened bids for the steel superstructure of sections A and B of Broadway bridge, as follows: Boston Bridge Works, $112,874; King Bridge Co., Cleveland, $119,500; Variety Iron Works, Cleveland, $119,000; Canton Structural Co., Albany, N. Y., $130,000; American Bridge Co., New York, $123,300; W. H. Keepers & Sons, Portsmouth, N. H., $121,950; Berlin Construction Co., Berlin, Conn., $128,000; Eastern Bridge & Structural Co., Worcester, $116,450; New England Steamboat Co., Boston, $113,900.

BRAZIL, IND.—It is said that the Vandalia R. R. will build a 100-ft. bridge over Birch Creek. The County Commissioners are also considering building a bridge, but it will be 60-ft. span.

BRENHAM, TEXAS.—The County Commissioners of Washington County, we are told, are considering having a new bridge built over New Year's Creek, but the plans are not yet made.

BRIDGEPORT, CONN.—Local reports indicate that something will soon be done toward building a new bridge over Ask Creek between Bridgeport and Fairfield, the cost of which will be about $24,000.

BROWNTOWN, WIS.—Philip Allen, of this place, will receive bids some time after the second week in November for a steel bridge over Pecatonica River.

CHICAGO, ILL.—Mayor Harrison, the Commissioner of Public Works and the Chicago City Ry. are considering the question of building a new bridge over the river at Archer avenue and Thirty-first street. The Mayor says the cost will be $200,000. The present bridge is 152 ft. long.

DOYLESTOWN, PA.—The County Commissioners want bids until Nov. 1 for building the new bridge on Jefferson avenue, according to plans on file with the Clerk.

FREMONT, OHIO.—The question of building two bridges across the Sandusky River, one in Fremont and one north of the city, will be decided at the November election. The bridge at Fremont will cost $15,000, and the one north of the city $100,000.

GASSVILLE, ARK.—We are told that a steel bridge will be built by the White River R. R. (Missouri Pacific), at this place, and that J. H. Reynolds, of Batesville, Ark., or Bluff City will let the contract.

GRAYSON, KY.—Bids are wanted Nov. 3 by S. M. Wylie, Bridge Commissioner, for two bridges, one 45 ft. long with 12-ft. roadway, and one 35 ft. with 12-ft. roadway.

GRUNDY, VA.—A bridge about 150 ft. long will be built over State Creek by Buchanan County, Va. Address the Clerk of Board of Supervisors.

HILO, HAWAII.—James H. Boyd, Superintendent of Public Works, wants bids until Oct. 31 for two steel bridges in the city of Hilo, Island of Hawaii. One will be over the Waiakea, 100-ft. span; the other over Wailuku River to be 170-ft. span, both to be 20-ft. roadway and to have two 4-ft. sidewalks. The substructure will be built by the Department of Public Works.

HOOSICK FALLS, N. Y.—The Bennington & Hoosick Valley Ry., we are told, will need a number of steel bridges. One will be 400 ft. long and one 200 ft., and several about 100 ft., with quite a number of smaller structures. (See Railroad Construction column.)

INDIANAPOLIS, IND.—Harry B. Smith, County Auditor, is advertising for bids until Nov. 6 for a bridge over Little White Lick Creek just north of Bridgeport.

It is said that the Cleveland, Cincinnati, Chicago & St. Louis will build a viaduct over its tracks at Noble street.

JOLIET, ILL.—Bids are wanted Oct. 20 at 12 noon by F. A. Jackson, Town Clerk, for a steel bridge 150 ft. long over Hickory Creek.

KANKAKEE, ILL.—The contract for building the superstructure for the bridge over Kankakee River, at Kankakee, Ill., for the Indiana, Illinois & Iowa R. R., was awarded to the King Bridge Co., Cleveland, Ohio, some time since.

KEWAUNEE, WIS.—On account of the delay in authorizing a new steel bridge over the Kewaunee River in the town of West Kewaunee, certain people in this town have contributed money to build a temporary bridge.

LUDLOW, MASS.—The town officers of Ludlow have again taken up the matter of building a bridge over Chicopee River between Indian Orchard and Ludlow.

LIBERTY, MISS.—J. J. White, of McComb City, Miss., is about to let a contract for a bridge on the line of the East Amite River R. R.

LOS ANGELES, CAL.—The Southern Pacific Co. has let the contract for the new bridge over Los Angeles River to the American Bridge Co. The railroad company will put in the foundations. It is a through-riveted double track (two-truss) bridge of three 113-ft. spans.

MADISON, VA.—We are told that a large steel bridge will be built over Robinson River by the Commissioners of Madison County, but no committee has yet been appointed to receive the bids.

MINNEAPOLIS, MINN.—Local reports say that two bridges over the Northern Pacific tracks at Harvard and at Como avenues will probably be built in the near future.

MONO LAKE, CAL.—J. N. Anderson is a member of the committee that has been appointed to build a bridge over Mill Creek for the county of Mono, and this committee will probably be ready to get bids in January.

OAKLAND, CAL.—The Realty Syndicate, which is building the pier at Emeryville, will shortly consider the question of a bridge across the Southern Pacific tracks at the foot of Fortieth street.

PITTSBURGH, PA.—The Baltimore & Ohio has two ordinances before the Pittsburgh Councils. One provides for a new station and the other for straightening a part of Second avenue from Lackawanna street to the city line, abolishing all the grade crossings and building a four-track road for that distance. The company also proposes to spend considerable money on eliminating the grade crossings between Glenwood and Braddock, five miles.

The Pennsylvania R. R. is reported to have let a contract to the Pittsburgh Construction Co. for a new and heavier steel bridge to be built over the Monongahela River at Port Perry. The new bridge will be double track, replacing the present single track structure, and the total cost of the steel will be about $550,000.

READING, PA.—The County Court of Berks County is considering building six new bridges.

ST. LOUIS, MO.—Bids are wanted Oct. 24, according to report, by the Board of Public Works, for the superstructure of the Eighteenth, Twenty-first and Grand avenue bridges.

ST. PAUL, MINN.—The proposition to build another bridge over the Mississippi River to take the place of the proposed Broadway structure is being considered.

SCRANTON, PA.—The original plans for the viaduct on West Lackawanna avenue have been revised by the Lackawanna R. R. and are being considered by the Director of Public Works of Scranton.

The committee appointed by the Director of Public Works is considering two sites for the proposed bridge over Lackawanna River which is to replace the old Race street bridge. It will cost $29,000.

SPOKANE, WASH.—The County Commissioners have agreed to appropriate from $12,000 to $14,000 towards the Hangman Creek bridge, which will cost $36,000.

SPOTTSYLVANIA, PA.—The Judge of the Spottsylvania County Court can give information about a bridge to be built on the county line over North River.

SYDNEY, NEW SOUTH WALES.—The time for receiving bids for the steel bridge over Sydney Harbor has again been extended, this time to Jan. 27, 1903.

TRENTON, NEB.—The County Commissioners of Hitchcock County want bids Nov. 7 for some bridge work. W. H. Thornhill, County Clerk.

VALENTINE, NEB.—Bids are wanted at once by W. E. Haley for a steel bridge.

WAVERLY, TENN.—The County Court has appointed a committee to locate a new bridge across Duck River above the mouth of Buffalo River.

WELLAND, ONT.—Separate bids are wanted Oct. 21 for building abutments, center piers, and guards, and superstructure for a steel draw bridge across the Welland River, at Montrose, about four miles from Chippewa. Length over all about 190 ft., length of draw, 110 ft., fixed span 80 ft., with a clear roadway of 16 ft.; concrete piers and abutments. Plans and specifications may be seen at the office of George Ross, Esq., C. E., Welland, Ont. Robert Cooper, Clerk.

WICHITA, KAN.—The County Commissioners have under consideration building the following bridges: At Derby, a steel structure over Big Texas River at $6,380; Wichita, Twenty-first street, $3,600; Park and Kechi township, steel, $6,000.

WHATCOM, WASH.—The Bellingham Bay & British Columbia Railway will rebuild the south span of the Everson railroad bridge over the Nooksack River and the "pony" span of the same bridge.

YOUNGSTOWN, OHIO.—It is said plans have been made

for the viaduct across the Erie R. R. tracks at Holmes street and North avenue. The cost will be about $75,000.

Other Structures.

Baltimore, Md.—The Southern Steel & Smelting Co. is about to let contracts for a new smelting and refining plant on Warner street.

Clarksburg, W. Va.—The Baltimore & Ohio will build a new passenger station here in the spring at a cost of $10,000.

Mahoningtown, Pa.—The Pittsburgh Construction Co. has received a contract from the Pennsylvania Company to build at Mahoningtown, near New Castle Junction, an extension to the present roundhouse, and to build a new machine shop. The latter will be 200 ft. long and 60 ft. wide.

Meridian, Miss.—The Mobile & Ohio has recently finished plans for a passenger station at Meridian, and it is said work will be begun soon.

Muncie, Ind.—C. M. Kimbrough, President of the Indiana Bridge Co., is reported as saying that his works will be rebuilt and doubled in size at a cost approximating $50,000. This will be done on a new site not yet named.

New Castle, Pa.—It is said that the Baltimore & Ohio has decided upon improvements at this place which will cost about $500,000. Quite a number of options on land have recently been closed for a site for the car and locomotive shops.

Phillipsburg, N. J.—The Ingersoll-Sergeant Drill Co. is said to have approved the plans for its new buildings at Phillipsburg.

Pittsburgh, Pa.—The Standard Engineering Co. has been formed with $300,000 capital, by officers of the National Tube Co. and the United States Steel Corporation, and a large plant will be built at Elwood City for all kinds of structural and engineering work. It is said contracts will be let at once for new buildings.

Savannah, Ga.—The Atlantic Coast Line, according to report, is considering plans for adding to its port facilities at Savannah.

South McAlester, Ind. T.—The Missouri, Kansas & Texas proposes to build a $40,000 brick passenger station in place of the present wooden structure.

St. Paul, Minn.—The general contract for building the brick engine house and a turn-table for the St. Paul Union Depot Co. has been let to Newman & Hoy.

It is reported that the Chicago, Milwaukee & St. Paul contemplates adding about 200 ft. to its freight house at the foot of Sibley street.

Suffolk, Va.—It is said that Messrs. Street & Bowen, of Norfolk, will establish locomotive and car shops at Suffolk.

Washington, D. C.—The general scheme for improvements at Washington Barracks, Washington, D. C., as prepared by a board of Army engineer officers and modified by McKim, Meade & White, of New York, has been approved by the War Department. The new buildings include a War College building, an Engineer School building, two barracks buildings for engineer troops, a general hospital, quarters for officers, a power plant, workshops, stables, etc. The War College building will be the largest and most important, costing about $500,000. It will be 320 ft. long, 110 ft. wide, and, like the other buildings, will be built of stone and brick of Colonial design. A sewerage system will also be introduced and a new sea wall will be built.

Whatcom, Wash.—The Bellingham Bay & British Columbia has decided to build a new station in this place opposite the Northern Pacific's freight station.

Wilmington, Del.—Contracts have been let by the Pennsylvania R. R. for the steel work for a number of new buildings as part of its new shop plant at Shellpot, just outside of Wilmington. There will be 12 buildings in all. Those included in the contract which is let to the Phœnix Iron Co., are the boiler and machine shop, blacksmith shop and planing mill.

MEETINGS AND ANNOUNCEMENTS.

(For dates of conventions and regular meetings of railroad associations and engineering societies see advertising page xvi.)

National Academy of Railway Surgeons.

The annual convention of this association was held at Kansas City, Oct. 2 and 3. The President for the ensuing term is Dr. L. Sexton (Illinois Central), of New Orleans, and the Secretary is Dr. T. B. Lacy, of Council Bluffs.

American Society of Civil Engineers.

At the meeting on Wednesday evening, Oct. 15, at 8:30, a paper by R. G. Allanson-Winn, M. Inst. C. E. I., entitled "The Protection and Improvement of Foreshores by the Utilization of Tidal and Wave Action," was discussed. This paper was printed in the "Proceedings" for August, 1902.

The Engineers' Club of Philadelphia.

A regular meeting of the club will be held on Saturday, Oct. 18, at 8 o'clock p.m. Paper, "Some Electrical Fire Hazards," illustrated, by Washington Devereux. Mr. Carl Hering will make a few remarks, postponed from the last meeting, on "The Latest and Best Value of the Mechanical Equivalent of Heat," and on "Recent Progress in Single Phase Traction."

Rocky Mountain Railway Club.

A regular monthly meeting of the Rocky Mountain Railway Club will be held at the Assembly Room, Union Depot, Denver, Colo., on the 18th inst. A paper "On the Preservation of Timber" has been specially prepared by Dr. Hermann Von Shrenk, of the United States Department of Agriculture, and will be discussed at this meeting.

J. E. Buell, 906 Twentieth avenue, Denver, has succeeded K. E. Steinhauer as Secretary.

Western Society of Engineers.

On Thursday, the 9th inst., something over 100 members of the society left Chicago on a special train for LaFayette, Ind., for the purpose of visiting Purdue University. The party arrived at Purdue at about 1 o'clock, where a luncheon was served. It was then separated into five divisions, each in charge of a member of the faculty, and shown through the various departments of the University. This occupied the greater part of the afternoon, the party reaching Chicago on the return at about 9 o'clock p.m.

Canadian Railway Club.

At the meeting of the Club, Sept. 9, discussion was continued on Mr. Neild's paper on the "Manufacture of Iron and Steel," in the form of a paper by Jno. Livingstone. Mr. W. H. Rosevear, Sr., General Car Accountant, Grand Trunk Ry., presented a paper on "Per Diem." Discussion followed and was continued at the meeting held on Oct. 14. At the meeting on Oct. 14, a paper was read on "Terminal Passenger Car Cleaning," by Thomas R. Cowan, Master Painter, Canadian Pacific Ry. M. P. Kelly has resigned as Secretary of the Club, and W. H. Rosevear, Jr., has succeeded him.

New York Railroad Club.

At the meeting on Sept. 18 the Secretary read the report of the Committee appointed to act on the suggestions of Edward A. Moseley, of the Interstate Commerce Commission, regarding "Safety Appliances." The Secretary then reported on the condition of the Club at the beginning of the new season. The membership is now 1,169, an increase of 200 for the year. The Club has not yet secured permanent quarters. Short papers on "The Construction of Perfect Track," by J. C. Brackenridge, Chief Engineer, Brooklyn Heights R. R., and R. Trimble, Principal Assistant Engineer, Pennsylvania Lines West, were made and discussion followed.

Pacific Coast Railway Club.

At the meeting on Sept. 20 Mr. Geo. H. Daniels' address on "American Railroads and Our Commercial Development" was read. J. Kruttschnitt, Jas. Angler, H. J. Small, J. H. Wallace, of the Southern Pacific Company, and A. W. Foster, President of the California North West, were elected to honorary membership. Answers were read to questions: "To What Extent Has the Adoption of the M. C. B. Coupler Increased the Damage to Cars in Switching?" also "Is the M. M. Association's Standard Front-End Arrangement Best Adapted to the Modern Locomotive, Having Wide Fire-Box, Increased Length of Flues and Larger Grate Area?"

The Franklin Institute.

The bulletin for the current month announces for the meeting of Thursday, Oct. 16, 8 p.m., a discussion on "Multiple Voltage Systems for the Speed Control of Tools," opened by Mr. Gano S. Dunn, Crocker-Wheeler Company, and Mr. H. Ward Leonard, Ward Leonard Electric Company.

The sixth annual series of popular scientific lectures, under the joint patronage of the Institute and the Central Branch of the Y. M. C. A., will be opened on Friday, Oct. 17, 8 p.m. Subject, "Polarized Light." Prof. Dayton C. Miller, Case School of Applied Science, Cleveland, Ohio (illustrated by numerous brilliant experiments).

Transportation Club of Atlanta (Ga.).

This new social organization opened its doors on Saturday last. The club rooms are on the seventh floor of the newly completed Peters building and are among the handsomest club quarters in the city. The club will be open from 9 o'clock in the morning until midnight. The reading and writing rooms are fitted up luxuriously and the quarters present a most pleasing appearance. The buffet has been well stocked. Lunch will be served in the cafe every day from 12 to 2 o'clock. This will be supplied by a local restaurant. The officers of the club are: C. E. Harman, president; S. F. Parrott, vice-president, and F. A. Healy, secretary. The membership is nearly 200.

Pacific Northwest Society of Engineers.

The Pacific Northwest Society of Engineers held a regular monthly meeting Saturday evening, Oct. 4, 1902, at 8 o'clock p.m., in the Chamber of Commerce rooms at Seattle.

The meeting was called to order by Mr. R. H. Thomson, President, and after the usual business was disposed of Mr. James E. Blackwell, Consulting Engineer and Architect, read a paper entitled "The Use of Concrete." Mr. Blackwell had a very exhaustive paper, dealing first with the ingredients that compose concrete, such as cement, lime, sand, gravel, broken stones, etc. He stated where and when cement was first manufactured, the different qualities and grades, etc.; lime was next dealt with. Mr. Blackwell then stated the best manner in which to mix concrete and how it should be placed in the trenches. It was voted to devote another meeting to this subject, when written discussions would be received and read.

General Passenger Agents.

The General Passenger and Ticket Agents' Association held its 47th annual meeting at Portland, Me., Oct. 14 and 15, with President James R. Wood (Pennsylvania) in the chair. General Passenger Agent George H. Daniels, of the New York Central, in a report gave an outline of the prosecution of ticket forgers. An injunction has been granted in Washington prohibiting the sale there of Grand Army tickets by scalpers for 30 days. The Association adopted a resolution offered by General Passenger Agent Bell, of the Grand Trunk, requesting auxiliary associations like the general baggage agents, traveling passenger agents and ticket agents, to appoint at their next meetings a representative to appear at the next following convention of the American Association and deliver a short address, reviewing the work of his organization during the preceding year, accompanied by suggestions for the betterment of passenger service.

On the question of what should be done by the steam railroads to meet the competition of electric lines, it developed that this competition in some cases has been beneficial, building up the suburban traffic. In other instances railroads affected by electric lines have closed way stations, making it possible to give better express service.

New Orleans was selected as the place to hold the next convention. The election of officers resulted as follows: President, O. W. Ruggles (Michigan Central), Chicago; Secretary, for the 24th consecutive time, A. J. Smith (L. S. & M. S.), Cleveland. Warren J. Lynch, of the Big Four, was chosen orator for next year.

PERSONAL.

—Mr. G. L. Potter, General Manager of the Baltimore & Ohio Railroad, accompanied by Mrs. Potter, has sailed for Europe, to be gone about six weeks.

—Mr. Albert Loeb, a Director of the St. Louis Southwestern Railway, died Oct. 12, at his home in New York City. Mr. Loeb was a native of Cincinnati and was 42 years old.

—Mr. Robert Maxon Greene, Assoc. M. Am. Soc. C. E., has been appointed Structural Engineer of the St. Louis World's Fair. Mr. Greene is a graduate of the Rensselaer Polytechnic Institute and was a member of the firm of Foster & Greene, structural engineers, and later of the firm of Greene & Ward, contractors, of New York.

—Mr. Archibald J. McKillop, the new Master Mechanic at Mattoon, Ill., of the Illinois Central is a Canadian by birth, having been born at St. Thomas, Ont., Aug. 13, 1868. He entered the service of the Michigan Central as a fireman in 1887, later being appointed Engineer. In August, 1892, he left this company to accept service with the Illinois Central, where he has remained ever since. Mr. McKillop assumed his new duties on Oct. 1, 1902.

—Mr. A. O. Dayton, Superintendent of the West Jersey & Seashore Railroad (the Pennsylvania's Atlantic City Lines), died at his home in Camden, N. J., Oct. 14. Mr. Dayton was about 50 years old. He had been in the service of the Pennsylvania system for many years and had been Superintendent at Camden about 19 years. Before that he was Superintendent of Motive Power on the Philadelphia & Erie Division of the Pennsylvania Railroad. Mr. Dayton had been ill for some time, but only seriously so for a short while, death being due to paralysis.

—Another group of officers from the North Eastern Railway of England will shortly be in the United States. Mr. H. A. Watson, General Superintendent; Mr. W. J. Cudworth, Engineer, and Mr. Vincent L. Raven, Assistant Chief Mechanical Engineer, sailed in the "Oceanic" on the 8th. Mr. J. Forsyth, Assistant General Traffic Manager, and Mr. J. B. Harper, Divisional Superintendent, sailed in the "Celtic" on the 17th. These gentlemen expect to sail from New York on their return on Nov. 15. They have already arranged a definite programme of what they would most like to see.

—Mr. J. J. Bayley, Master Mechanic of the Southern Railway at Lawrenceville, Va., was born in Accomac County, Va., May 3, 1854. He began his railroad service with the Richmond & Danville at Manchester as a machinist; was promoted to foreman of machine shop in May, 1886, where he remained until November, 1889, when he resigned to go with the Richmond Locomotive Works as Superintendent of Locomotive Construction, but resigned the following year and returned to the Richmond & Danville, where he remained until Sept. 20 last, when he became Master Mechanic of the Southern Railway.

—Mr. A. T. Abbott, Division Superintendent of the Chicago, Rock Island & Pacific, was born at Morris, Ill., April 15, 1860. Mr. Abbott's entire railroad service has been with this company with the exception of three years (1890-1893), when he served as Trainmaster at Colorado City for the Colorado Midland Railway. His railroad service dates from 1876, when he began with the Rock Island as telegraph operator. From this position he passed through the various positions of Train Despatcher, Trainmaster and Division Superintendent, having assumed the Superintendency at different times of the Southern, Nebraska and Colorado Divisions. Mr. Abbott now has charge of the Colorado Division at Colorado Springs, Colo.

—Mr. Samuel R. Richards, Master Mechanic of the Southern Railway, at Selma, Ala., was born in Sacramento, Cal., Sept. 16, 1865. He started his railroad service in 1882 with the Richmond & Danville. In October, 1890, when the Richmond & Danville secured control of the Georgia Pacific Railway he was sent to Atlanta, Ga., as General Foreman of the Georgia Pacific Division. Mr. Richards held this position until August, 1894. When the Richmond & Danville and the East Tennessee, Virginia & Georgia were merged into the Southern he was made inspector of scales of the entire system. At the end of five months he became General Mechanical Foreman. In February, 1901, he was transferred to Greensboro, N. C., where he remained until April 1, this year, at which time he was appointed Master Mechanic at Lawrenceville, Va., and from which position he has just been appointed as above.

—Mr. Azel Ames, Jr., lately appointed Signal Engineer of the Boston & Albany, was born at Wakefield, Mass., June 3, 1873. He went to Phillips Academy at Andover, Mass., and then entered the Massachusetts Institute of Technology, graduating in 1895, after taking a course in Civil and Mining Engineering. Early in June of that year he went with the Boston & Maine as a transitman and worked as such and as Assistant Engineer until 1896, when he resigned as Assistant Engineer and went to work in the section gang on the Western Division, where he remained until 1898. Mr. Ames served in the Spanish War as Captain in the 1st Regiment United States Volunteer Engineers. After being mustered out of the service in 1899 he took the position of Assistant Roadmaster on the New York Central & Hudson River and during that year (1899) had special duties assigned to him and was also Supervisor. In August, 1901, he went with the Boston & Albany as Roadmaster, from which position he has recently been promoted.

—Mr. T. S. Reilly, Master Mechanic of the St. Louis & San Francisco, was born at La Porte, Ind., in 1870. He entered railroad service as a messenger for the Master Mechanic at Fort Worth, Texas, of the Texas & Pacific in 1882. Mr. Reilly graduated as civil engineer from the Pennsylvania Military College in 1890, at the age of 20. In the same year (1890) he went with the San Antonio & Aransas Pass. In January, 1891, he went with the Fort Worth & Rio Grande, but shortly returned to the San Antonio & Aransas Pass. In February, 1894, Mr. Reilly left this company to take a student's course in the Westinghouse Electric & Manufacturing Company's Works at Pittsburgh, where he remained until September, when he returned to Texas and took a position with the Gulf, Colorado & Santa Fe. From then until 1899, Mr. Reilly was connected with several roads in various positions. In June, 1899, he became Mechanical Editor of the *Railway and Engineering Review*. Two years later he went with the Westinghouse Air-Brake Co., and in July, 1902, he went with the Frisco System as Assistant Road Foreman, and on Sept. 25 last was appointed Master Mechanic at Sapulpa, Ind. T.

—Mr. F. P. Hickey, recently appointed Master Mechanic of the First, Second and Third Divisions of the Seaboard Air Line Railway, is a native of Pennsylvania, having been born in that State in 1863. Mr. Hickey's railroad experience dates from 1876, having begun with the Pennsylvania Railroad. In 1884 he went with the Norfolk & Western at Roanoke, Va., being appointed Assistant Foreman the following year. In 1887 he went to the Erie Railroad, where he remained from August until November, when he was made inspector. In 1889, Mr. Hickey returned to the Norfolk & Western as Assistant Foreman, and the same year was sent by this company as inspector to the Rogers Locomotive Works at Paterson, N. J. In 1897 he resigned as foreman of the erecting department to become General Foreman of the South Carolina & Georgia, where he remained until August, 1899, when he again returned to the Norfolk & Western as General Foreman at Kenova, W. Va. That same year he took the position of Master Mechanic with

the Atlantic Coast Line, but resigned to go with the Atchison, Topeka & Santa Fe as General Foreman. In August, 1901, Mr. Hickey took a similar position with the Seaboard Air Line, and in April of this year (1902) he was promoted to the position of Master Mechanic of the First Division, and on Aug. 6 assumed the duties of the Second and Third Divisions.

ELECTIONS AND APPOINTMENTS.

Alabama Great Southern.—A. J. Frazer, Superintendent, with headquarters at Birmingham, Ala., has resigned, and the duties of that office will, until further notice, be assumed by J. W. Hood, Assistant Superintendent, effective Oct. 11.

Atchison, Topeka & Santa Fe.—D. E. Sulier has been appointed Division Master Mechanic, with headquarters at Raton, N. Mex., succeeding D. Patterson.

Baltimore & Ohio.—J. E. Muhlfeld, heretofore Superintendent of Rolling Stock and Machinery of the Intercolonial, has been appointed Assistant to the General Superintendent of Motive Power of the B. & O., with headquarters at Baltimore, Md. O. Rickett has been appointed Division Engineer of Maintenance of Way, with headquarters at Grafton, W. Va., succeeding James Burke.

Central of New Jersey.—F. G. Sherman has been appointed Superintendent of Telegraph, with headquarters at Jersey City, N. J., succeeding C. P. Adams.

Central Vermont.—At the annual meeting, held Oct. 14, C. M. Hays (Second Vice-President and General Manager of the Grand Trunk) was elected President of the C. V., succeeding E. C. Smith.

Chicago & Alton.—F. W. Tracy has been elected a Director, succeeding R. C. Clowry.

Chicago, Rock Island & Pacific.—D. W. Cunningham has been appointed Master Mechanic, with headquarters at Valley Junction, Iowa, succeeding J. B. Kilpatrick, who has been transferred to be Master Mechanic, at Horton, Kan., succeeding A. L. Studer, who in turn has been transferred as Master Mechanic at Cedar Rapids.

Illinois Central.—J. F. Price, heretofore Foreman, has been appointed Master Mechanic, with headquarters at Water Valley, Miss., succeeding J. G. Neudorfer.

Iowa Central.—W. O. Johnson has been appointed Master Mechanic, with headquarters at Marshalltown, Ia.

Kentucky & Indiana Bridge & R. R.—W. M. Greene (Vice-President and General Manager of the Baltimore & Ohio Southwestern) has been elected President of the K. & I. B. & R. R., succeeding W. H. McDoel. W. M. Mitchell has been appointed Manager, succeeding T. H. Hayden, Acting Manager.

Lake Erie & Western.—George Dyer, heretofore Superintendent at Muncie, Ind., has been appointed Superintendent, with headquarters at Lima, Ohio, succeeding H. F. Bickell, resigned.

Louisville & Nashville.—J. G. Clifford, heretofore Division Master Mechanic at Louisville, Ky., has been appointed Master Mechanic of the Louisville Terminals, with headquarters at South Louisville, Ky.

Missouri Pacific.—W. T. Tyler, heretofore Superintendent at De Soto, Mo., has been appointed General Superintendent at St. Louis.

National R. R. of Mexico.—M. M. Reynolds, heretofore Auditor of the Central Vermont, has been appointed Comptroller of the N. R. R. of M.

New York, Susquehanna & Western.—At a meeting of the Board of Directors, held Oct. 13, Daniel Willard was elected Third Vice-President.

Norfolk & Western.—A. C. Needles has been appointed Superintendent of the Norfolk Division, with headquarters at Crewe, Va., succeeding T. Low, resigned on account of ill health. G. P. Johnson, heretofore Trainmaster, has been appointed to succeed Mr. Needles as Superintendent of the Shenandoah Division, with headquarters at Roanoke, Va.

Oregon Short Line.—W. S. McCormick has been elected a Director, succeeding T. R. Jones, resigned.

Southern.—At a meeting of the stockholders held recently C. Lanier and E. D. Randolph were elected Directors. N. E. Sprowl, Master Mechanic, with headquarters at Alexandria, Va., has resigned.

Tennessee Central.—O. M. Laing has been appointed Purchasing Agent, with headquarters at Nashville, Tenn.

Union Pacific.—J. H. Howe has been appointed Supervisor of Bridges and Buildings, with headquarters at Omaha, Neb., succeeding J. Lanktree, resigned.

Wabash.—W. S. Pierce has been elected a Director, succeeding P. B. Wyckoff.

West Side Belt.—C. V. Woods has been appointed Superintendent, with headquarters at Castle Shannon, Pa.

RAILROAD CONSTRUCTION.

New Incorporations, Surveys, Etc.

ATLANTIC & BIRMINGHAM.—See Railroad News.

AUBURN & SYRACUSE (ELECTRIC).—A company with this name has been formed as a consolidation of the Auburn City Ry. and the Auburn Interurban Electric Co. When the plans of the directors are completed the road will extend from Auburn to Syracuse, 26 miles, of which 17 miles, between Syracuse and Skaneateles, is now building. H. S. Holden, Wm. Nottingham and others, of Syracuse, and G. B. Longstreet, of Auburn, are interested.

BALTIMORE & OHIO.—Work is reported in progress grading and changing to standard gage the old line extending from the Ohio steel plant near Youngstown, Ohio, to Niles, on the south side of the Mahoning River. The line was formerly known as the Painesville & Youngstown.

BENNINGTON & HOOSICK VALLEY (ELECTRIC).—An officer writes in regard to the announcement that it is proposed to build three extensions in New York, that the project has not yet been financed, but that prospects seem to be good for building in the near future. The work to be done is not particularly difficult and the grades are easy. There will be, however, several steel bridges, one 200 ft., and several smaller ones. The road as now worked is 16½ miles long. Geo. E. Greene, of Hoosick Falls, is President. (Oct. 3, p. 765.)

BLACKWELL, ENID & SOUTHWESTERN (ST. LOUIS & SAN FRANCISCO).—Work on this new line in Texas is now completed northeast from Vernon for a distance of about 45 miles, and about 70 miles more are to be built at present. Seely Dunn, Austin, Texas, is Vice-President and General Manager.

BRIDGEPORT & DORAN'S COVE.—Most recent advices concerning this new road in Alabama state that about half of the 12 miles projected have been completed. It is designed to reach coal fields.

BRUNSWICK & BIRMINGHAM.—It is understood that work will begin at once on a line 11 miles long between Tracy and Ocilla, Ga., to make connections with the Atlantic & Birmingham. See under Atlantic & Birmingham, Railroad News.

CANADIAN PACIFIC.—Grading is reported completed for 34 miles beyond Yorkton, in eastern Assiniboia, and it is expected that 40 miles will be graded before the season is closed. Track is to be laid at once and it is thought that the line will be opened next spring. This is a branch of the Manitoba & Northwestern, which is being built in the direction of Prince Albert.

An officer denies current reports that surveys and explorations between Hope, on the Fraser River, and Midway, B. C., have been made in the interest of his company.

CANE BELT.—An officer is quoted as saying that an extension will be built from Eagle Lake to Houston, Texas, a distance of about 60 miles. Until its own tracks are completed, it is said that a traffic arrangement will be made by means of which trains can be operated into Houston.

CHATTAHOOCHEE & GULF (CENTRAL OF GEORGIA).—At a meeting of the directors Oct. 6, an extension from Sellersville, Ala., to Florala, 24 miles, to connect with the Yellow River R. R., was authorized. The Chattahoochee & Gulf at present extends from Columbia, Ala., to Sellersville, and is worked by the Central of Georgia under lease.

CHEAT VALLEY.—An officer of this company writes in response to inquiries, that there is no connection between his organization and the new incorporation under the name of Cheat River, which proposes to build in practically the same country in West Virginia. The Cheat Valley at present operates a line seven miles long from Whetsell to Rowlesburg, which is operated for freight only, and the proposed extension from Whetsell to Albrightsville is under consideration, but nothing has been done as yet. Richard L. Humphrey, 1001 Harrison Building, Philadelphia, is Chief Engineer.

CHICAGO & ALTON.—Surveys are reported in Missouri, leaving the main line at Littleby and going direct to St. Louis by way of Middletown, Troy and Old Monroe, a distance of about 95 miles, which if built will shorten the distance between Kansas City and St. Louis considerably.

CLEVELAND-DUCKTOWN (ELECTRIC).—Application for a charter to build an electric line between these points in Tennessee, 30 miles distant, has been made. It is proposed to build by way of Benton. The incorporators are M. C. King, of Ducktown; B. F. McClary, of Benton, and others.

COOS BAY & SALT LAKE.—The accompanying cut shows the location survey of the new belt line railroad around the edge of Coos Bay. The line extending south

is now in operation to Myrtle Point, 27 miles, and another short road runs to the Libby coal mines. (July 11, p. 561.)

CRESTON ELECTRIC RAILWAY, LIGHT, HEAT & POWER.—Contract for the projected line from Creston to Winterset, Iowa, 27 miles, has been let to the James H. Collin Co., of Chicago. The railroad company started out last spring to build the line on its own account, but gave it up after completing a few miles of grading. It is planned ultimately to build a number of electric lines in Iowa and Nebraska, besides the one under way. E. G. Baker, of Macksburg, Iowa, is President. (May 23, p. 385.)

DENVER, ENID & GULF.—Announcement is made that a new line will be opened by the first of November from Enid, Okla. T., to Marshall, 27 miles, by way of Junction City and Douglas. It will eventually be continued to Guthrie, 56 miles from Enid.

DES MOINES, IOWA FALLS & NORTHERN.—The extension south from Fernald, Iowa, to Nevada, Iowa, six miles, has been completed and is in operation.

FORT SMITH & WESTERN.—An extension from Crowder City, Ind. T., west to Indianola, Ind. T., eight miles, has been completed.

FORT WAYNE & SOUTHWESTERN.—This company was incorporated in Indiana Oct. 9 to build from Indianapolis to Hicksville, on the Ohio State line, 124 miles, running through the northwestern counties of Indiana. Local capital is interested.

FORT WORTH & RIO GRANDE (ST. LOUIS & SAN FRANCISCO).—According to most recent advices the extension south from Brownwood to Brady, Texas, will be completed about Nov. 15. Surveys have also been made to San Antonio, 175 miles from Brownwood, and it is said that work will be continued south from Brady without cessation. (Sept. 26, p. 749.)

GEORGIA, FLORIDA & ALABAMA.—The extension from Arlington, Ga., north to Edison, nine miles, has been completed.

GLENFIELD & WESTERN.—An officer is quoted as saying that 13 miles of track have been laid on this new line between Glenfield and Page, N. Y., and that it will be continued two miles further to Monteola. A. S. Page, Oswego, N. Y., is President. (Aug. 16, 1901, p. 582.)

GRAND RAPIDS & INDIANA.—Location is being made of a line from the Colonial Hotel on Indian Point, at Burt Lake, Mich., to the main line at Alanson, a distance of about seven miles. It is said that the branch will be opened for business before next summer.

GREAT NORTHERN.—It is said that the line will be extended from Grand Rapids, in Itasca County, Minn., to Hibbing in St. Louis County, a distance of 35 miles, to develop ore fields along the line.

GROVE-AFTON (IND. T.).—Surveys are reported in progress between these two points in Indian Territory, 16 miles distant. It is thought that the St. Louis & San Francisco may be interested.

HAMILTON & CALEDONIA (ELECTRIC).—Arrangements are now being completed to begin work in the spring on this projected line between the points named in Ontario, 12 miles distant. J. G. Gauld, Hamilton, Ont., is interested.

HOUSTON & TEXAS CENTRAL.—According to most recent advices, the extension from Burnet to Lampasas, Texas, 24 miles, will be completed about the first of November. (Oct. 10, p. 785.)

INTERNATIONAL & GREAT NORTHERN.—Track laying on the extension to Fort Worth has now been carried as far as Pear City, 12 miles northwest of Italy, Texas, and it is thought that the probabilities are good of reaching Fort Worth by Nov. 1.

JOLIET & NORTHWESTERN (ELECTRIC).—This company has been chartered in Illinois to build from Joliet in a westerly direction to Newark, Kendall County; Blackville and Morris in Grundy County; Plano and Aurora in Kane County, and Sandwich in DeKalb County, a total of about 65 miles. The company's office will be at Joliet, and the directors are W. R. Newton and E. H. Young, of Yorkville, Ill., and others.

KLONDIKE MINES.—A shipment of rails to begin the track laying of this new road in the Yukon has been received at Dawson. The right of way is now being cleared at Klondike City, and it is said that part of the road will be built this fall; enough so that a good start can be made next spring.

KNOXVILLE, LAFOLLETTE & JELLICO.—An amendment has been filed to this company's charter to permit of building a branch line in Anderson County, Tenn., to reach Oliver Springs. J. B. Newton, Knoxville, Tenn., is President.

LAKE SUPERIOR & ISHPEMING.—Work is reported in progress on a branch line four miles long extending to the Maas mine near Negaunee, Mich. This company is operated under the same management as the Munising, which was reported in our issue of Oct. 10 as having recently completed a new line 18 miles long. The Marquette & Southeastern, 27 miles long, was put in service as a connection between Munising and the Lake Superior & Ishpeming July 1, and is also operated under the same management.

LITTLE KANAWHA.—Bids have been asked for work on the extension which will form part of the new line to be built by the Wabash in West Virginia. Two sections are to be contracted at present, one from Parkersburg to Burnsville, about 75 miles, and one from Burnsville to Buckhannon, about 50 miles. It is said that in 10 days or two weeks bids will be asked on the section from Parkersburg to Zanesville, Ohio, and from Buckhannon to Belington, W. Va., where connection will be made with the West Virginia Central & Pittsburgh.

LONDON, AYLMER & NORTH SHORE ELECTRIC.—Articles of incorporation have been filed in New York by this company which proposes to build an electric railroad 50 miles long in Canada. James H. Hitchcock, J. Edward Howard and others, of New York City, are directors.

LOUISVILLE & NASHVILLE.—Extension of the Geneva branch southeast to a junction in Florida with the Pensacola & Atlantic Division, is reported in contemplation, and a spur from the branch is also being run south to Pensacola. Work is in active progress at present on this spur, which will connect Opp, Ala., with Florala, which is just on the Alabama side of the Florida line, 22 miles from Opp.

MARQUETTE & SOUTHEASTERN.—See Lake Superior & Ishpeming.

MEXICAN CENTRAL.—Work is reported begun by a large force on the new line between Tuxpan and Colima, 45 miles, and it is said that the extension will be completed by the end of 1903. Hampson & Smith are the contractors. (Sept. 26, p. 749.)

MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE.—Terminal rights of way are reported secured at Aberdeen, S. Dak., and it is said that the line will be extended to that point. Last spring an officer wrote in regard to this projected line that it was not likely any work would be done on it during 1902. (March 28, p. 236.)

MONONGAHELA, MCKEESPORT & YOUGHIOGHENY.—This company was chartered in Pennsylvania Oct. 10 to build from a point on the Pittsburgh, McKeesport & Belle Vernon near Coursin's Station, to a point on the Pittsburgh & Connellsville near the Youghiogheny River.

MONTANA R. R.—Contract has been let to grade an extension 62 miles long from Harlowton, Mont., to Lewistown. The road is now in operation between Lombard and Harlowton, a distance of 94 miles. Robert Rantoul, Helena, Mont., is General Manager. At present connection between Harlowton and Lewistown is made with stages. (Aug. 29, p. 682.)

MUSKOGEE SOUTHERN.—Charter has been granted to this company in Indian Territory to build a north and south line from a point four miles from Arkansas City, across Indian Territory, eventually terminating at Shreveport, La. The incorporators are C. N. Haskell, W. T. Hutchins and others, of Muskogee, and it is said that Philadelphia capital is interested.

NEW ALBANY, PAOLI & FRENCH LICK VALLEY TRACTION.—Franchises have been secured by this company for an electric line which it is proposed to eventually continue to Louisville, Ky. Two routes are being surveyed, one from Paoli and Orleans to Mitchell, and another from Jasper to Mitchell by way of French Lick,

and rights of way have been secured from a large number of towns through which the road will pass.

NEWTON & NORTHWESTERN.—This company, successor to the Boone, Rockwell City & Northwestern, has made a mortgage to the Old Colony Trust Co., of Boston, trustee, to secure $2,500,000 5 per cent. gold bonds, due in 1932, but subject to call at 110 and interest. An officer writes that contracts will be let at once for grading, track laying, bridges, etc., that the line has been located from Boone by way of Fraser and Gowrie to Rockwell City, Iowa, 48 miles, and that it is also proposed to build from Newton by way of Mongo, Cambridge and Kelly to Boone. The total length, when completed, will be 104 miles. The Boone, Rockwell City & Northwestern at present operates a line 21 miles long between Fraser and Gowrie, Iowa. Hamilton Browne, of Boone, Iowa, is President. (Sept. 26, p. 750.)

NEW YORK, ONTARIO & WESTERN.—The extension of the Ellenville branch is now in operation from Kerhonkson, N. Y., to High Falls, 10 miles.

NORTHERN PACIFIC.—Surveys are reported with a view to making changes on the Coeur de Alene branch in Montana. No statement has been made as to the plans of the company, but it is thought a long cut-off is in contemplation.

The extension from Iron River, Wis., northeast to Washburn, 34 miles, on the Washburn branch of the Lake Superior Division, is now open for business.

NORTHAMPTON & BATH.—Contract to build this new line six miles long from the works of the Atlas Portland Cement Co. at Northampton, Pa., to Bath, has been let to the Broadhead Contracting Co. The Atlas Portland Cement Co. is the builder of the line, of which J. Rogers Maxwell, of New York, is President. (July 11, p. 562.)

PAN-AMERICAN.—The first 30 miles of this projected line is now reported completed and in operation between Arista, on the Pacific coast of Mexico, to Aurora. Work is in progress on both ends of the line, the intention being to extend from Arista to San Geronimo, where connection will be made with the National Tehuantepec. From Aurora the road is being built east from a point on the Guatemala border.

PORT ANGELES PACIFIC.—The City Council of Port Angeles, Wash., have granted franchise to this company to build a standard gage road over certain streets, in return for which the company agrees to build a line 10 miles long before May 1, 1903, and to connect with the Northern Pacific branch building north from Gray's Harbor by October, 1904.

RATON-SANTA CRUZ.—Articles of incorporation have been filed in New Mexico for a railroad to run from Raton, across New Mexico, Arizona and California to Santa Cruz. No other information is at present available concerning the project.

RIO SECO.—Concessions have been granted by the Mexican Government to Benj. Barrios, of the City of Mexico, in behalf of a syndicate of New York men to build a railroad between Cardenas, on the Grijaba River, in the State of Tabasco, Mexico, to the port of Chiltepec.

RONCEVERTE, LEWISBURG & WESTERN.—Surveys are reported completed on this new line, chartered in West Virginia last June to build between the points named, six miles. Grading will begin about the first of November. E. C. T. Davis, Jr., of Lewisburg, W. Va., is President. (June 20, p. 486.)

SISTERSVILLE & MIDDLEBOURNE STREET.—Charter has been granted this company in West Virginia to build an electric line between the points named, about 20 miles long. John A. Howard, of Wheeling, W. Va., may be addressed.

SNAKE RIVER VALLEY.—Work has been stopped on this new line between Lewiston, Idaho and Riparia, Wash., which was to have been built jointly by the Northern Pacific and Harriman System and operated for their mutual benefit. The exact nature of the difficulty which has arisen is not known. The Lewiston-Riparia line will occupy strategic ground as the shortest outlet for the large area of rich territory above Lewiston.

SOUTH & WESTERN.—This line now operating between Johnson City, Tenn., and Huntdale, N. C., has been extended to Green Mountain, N. C., four miles beyond Huntdale. Geo. L. Carter, of Bristol, Tenn., is President.

SOUTHERN.—It is said that a new line will be built from Okolona, Miss., on the Mobile & Ohio, into Chickasaw and Calhoun Counties. The total length as projected is about 35 miles.

SOUTH WESTERN TRACTION COMPANY.—Tenders are to be asked at once to build a portion of this projected line in Ontario, 10 miles long, between London and Delaware. Franchises are now being sought from the London City Council to operate over certain streets. The company has power to build from Glencoe, Ont., through London to Hamilton. J. C. Rumball, London, Ont., is the principal promoter.

SPRING CREEK.—This company was chartered in Pennsylvania Oct. 8 to build from a connection with the Buffalo, Rochester & Pittsburgh and the Clearfield railroads at or near Carman, Spring Creek Township, Elk County, Pa., to a connection with the Clarion River R. R., at or near Hallton, in the same county and township. The projected distance is 25 miles. G. W. Childs, of Ridgway, Pa., is President.

ST. LOUIS, IRON MOUNTAIN & SOUTHERN (MISSOURI PACIFIC).—It is said that work will begin at once on a spur line five miles long from Kensett, Ark., to Searcy, paralleling the Searcy & Des Arc.

SUFFOLK & CAROLINA.—A syndicate composed of the International Trust Co. of Baltimore, J. W. Middendorf & Co., Baker, Watts & Co., and W. C. Seddon, will, it is said, finance the proposed changes contemplated in this property, which include an expenditure of approximately 1,000,000 in transforming the line, 51 miles long, from narrow to broad gage, and the building of a 25-mile extension to Elizabeth City, N. C. (Sept. 19, p. 734.)

TEMISKAMING & NORTHERN ONTARIO.—Contract to build the first 11 miles of this projected line from North Bay, Ont., to a point on Lake Temiskaming, 110 miles distant, have been let to A. R. McDonnell. It is understood that 49 miles more must be completed before the close of next year. (Sept. 19, p. 734.)

TENNESSEE CENTRAL.—Ground was broken at Clarksville, Tenn., Oct. 2 for this new line.

TENNESSEE, GEORGIA & SOUTH CAROLINA.—Charter was granted this company Oct. 1, application having been made several weeks ago to build from Blue Ridge, Ga., to Charleston, Tenn., a distance of 200 miles, connecting with the Atlanta, Knoxville & Northern and the Atlantic Coast Line at Blue Ridge, and with the Southern at Charleston. Merrill Skinner, of Blue Ridge, Ga., may be addressed. (Sept. 12, p. 716.)

TEXAS & OKLAHOMA (MISSOURI, KANSAS & TEXAS).—It is said that the contract for the new line from Coalgate, Ind. T., to Oklahoma City, Okla. T., 110 miles, will be let this month. Surveys were reported last August. (Aug. 8, p. 632.)

TEXAS CENTRAL.—An officer writes in regard to the extension between Waco and Ross, 11 miles, that for the past 22 years the Texas Central Co. has been using a stretch of track between these points jointly with the Houston & Texas Central, and has occupied with them the terminals at Waco. Early in 1902 it was decided to build an independent line and terminals, and these were completed and occupied on the first of September. The new line is being laid with 77½ lb. rails. A disastrous flood in July destroyed the two 150-ft. steel bridges in Bosque County. Instead of rebuilding these, together with that portion of the line which was washed away, temporary structures were put in and a new line was located which avoided both bridges and effected a saving of nearly 1,000 ft. in distance. (Feb. 28, p. 154.)

TEXAS SOUTHERN.—The State Railroad Commission has granted the requested application to issue bonds to the amount of $525,000 to provide for the projected extension to the Gulf. The road is now in operation from Winsboro, Texas, where connection is made with the Missouri, Kansas & Texas to Marshall, 74 miles southwest, where connection is made with the Texas & Pacific.

TONY & NORTHEASTERN.—This company filed articles of organization in Wisconsin Oct. 6, with the purpose of building a railroad 18 miles northeast from Tony, in Gates County. The incorporators are John Hein, A. F. Hein, W. F. O'Connor and others, of Tony.

UNION PACIFIC.—Contract has been let to the Utah Construction Co. for a cut-off about two miles long near Hampton Station in Uintah County, Utah. The work will take out a number of curves and reduce the grade and will cost about $25,000.

UNITED RAILWAYS & ELECTRIC (BALTIMORE).—Work on the extension between Dundalk and Sparrows Point, a distance of about 20 miles, which is being built under the charter of the Dundalk & Sparrows Point Ry. Co., is now about three-fourths completed and will probably be in operation before the first of next year. It is said the United Railways & Electric Co. will issue new bonds secured by a first mortgage on the extension. About $400,000 has already been spent.

VIRGINIA ROADS.—A shipment of rails and other materials has been received at Afton, Va., consigned to the Rockfish Mining Co., for use in building a spur line two miles long from the Rockfish Copper mines to the furnace.

WABASH.—It is said that a branch line will be built between Washington and Waynesburg, Pa., a distance direct of about 20 miles. Meetings of land holders have been held and the question of granting rights of way discussed. The Waynesburg & Washington now operates a line 29 miles long between the two points.

WASHINGTON & ELBERTON.—It is said that grading will begin about Dec. 15 on a new line between these points in Georgia, 30 miles distant. C. E. Smith, of Washington, Ga., may be addressed.

WATERLOO & CEDAR FALLS RAPID TRANSIT.—This company has filed an amendment to its articles of incorporation with the Secretary of State of Iowa, increasing the capital stock from $600,000 to $1,200,000 for the purpose of extending from the present terminus at Denver, Iowa, to a connection with the Chicago & Great Western at or near Tripoli, Iowa. A line was completed from Waterloo to Denver, Iowa, 13 miles, in 1901, with the intention of operating it by electricity for passenger service, and by steam for freight. The present extension will add 10 miles to the length of the line. Louis S. Cass, Waterloo, Iowa, is President.

WILSONBURG-SARDIS (WEST VIRGINIA).—It is said that the Chieftain Coal & Coke Co. is making surveys for a railroad to run between the points named in West Virginia, about eight miles, and reach coal properties.

WINDSOR, ESSEX & LAKE SHORE RAPID (ELECTRIC).—Surveys are now practically completed for the first section of this projected line from Windsor to Kingsville, Ont., a distance of about 25 miles. Seligman, Burk & Co., of New York City, are said to be interested.

WISCONSIN & MICHIGAN.—Six miles of the extension from Faithorn Junction to Norway, Mich., has been completed. It is not probable that the projected line will be carried beyond Norway at present, which leaves about six miles more work to be done, and it is thought that this section will be put in operation by the first of next year. The road is now in operation between Faithorn Junction and Peshtigo Harbor, a distance of 56 miles. (June 6, p. 422.)

WOLFE, MEGANTIC & LOTBINIERE.—It is said that work will be begun next spring on this projected line in Quebec from Lime Ridge, in the county of Wolfe, north to Quebec bridge on the St. Lawrence, a distance of about 90 miles direct through Wolfe, Megantic, Lotbiniere and Levis Counties in the Province of Quebec. Application to the Quebec Legislature will be made in January, 1901. The Quebec bridge is now building and it is intended to make a connection at the southern end with the Portland & Rumford Falls. W. H. Lambly, of Inverness, Que., is interested.

ZACATECAS-MINILLAS.—Surveys are reported for a new extension from a point on the main line in the State of Zacatecas, Mexico, to the Minillas mining camp, 25 miles. The concession for this road was obtained from the Government by Emetrio de la Garza, Jr., a lawyer of the City of Mexico.

GENERAL RAILROAD NEWS.

ALBANY & HUDSON (ELECTRIC).—The first step in the projected reorganization of this company was taken Oct. 10, when Justice D. Cady Herrick, on motion of Sheehan & Collin, attorneys for the Colonial Trust Co., of New York, appointed Geo. T. Blakeslee, of Kinderhook, N. Y., receiver. The attorneys in their petition allege that the road is bonded for more than its true value. A plan of reorganization without foreclosure was arranged last spring. (April 4, p. 258.)

ATLANTIC & BIRMINGHAM.—Arrangements are reported completed between this company and the Brunswick & Birmingham by which the Atlantic & Birmingham gives the latter trackage over 30 miles of its line and receives in return entrance into Brunswick. Work was to have begun Oct. 7 on a spur line 11 miles long to make the necessary connection.

BIRMINGHAM BELT.—The litigation over this property by the St. Louis & San Francisco and Seaboard Air Line interests is reported to be amicably settled and local press reports say that the Belt and other tracks in and about Birmingham, Ala., will be used jointly by the two companies, that other railroads in Birmingham will be granted trackage on equitable terms, and that the Seaboard will push its new line which is to be built into Birmingham. An officer is quoted as confirming this statement.

DENVER, KANSAS & ATLANTIC.—Application has been made by the directors of this company to join the Guthrie, Shawnee & Coalgate at Guthrie, Okla. T., in building the projected line from Pueblo, Colo., to Coalgate, Ind. T., a total distance of about 400 miles. The Denver, Kansas & Atlantic is now making surveys between Denver and Pueblo and Enid, Okla. T., and intends to begin work within 60 days.

MORGANTOWN & KINGWOOD.—It is reported that this line in West Virginia, which has completed about 14 miles and is projected as far as Kingwood, in Preston County, has been purchased by Senator Stephen B. Elkins. The Morgantown & Kingwood is so situated that it would be of service in connection with the projected Wabash tidewater extension, and it has in independent use in reaching coal lands which have recently been purchased by Mr. Elkins.

NEWTON & NORTHWESTERN.—See under Railroad Construction.

NEW YORK & OTTAWA.—Foreclosure sale of this property is advertised for Nov. 20 at St. Regis, Franklin County, N. Y. The line owned directly runs from Tupper Lake, N. Y., to the St. Lawrence River at Cornwall Bridge, and stock holdings in the Ottawa & New York and Cornwall Bridge companies are also to be included in the sale. The upset price is $1,000,000.

NORTH JERSEY TRACTION.—It is said that the arrangements for joint control of the entire trolley system in the northern part of New Jersey has been completed and contracts for the delivery of a majority of the stock of the North Jersey Street R. R., the Jersey City, Hoboken & Paterson and other lines, are now held by the Fidelity Trust Co. It is understood that the actual transfer of stock will not take place until the money market is easier. The aggregate par value of the holdings now in the pool are said to be about $6,000,000. U. H. McCarter, J. F. Dryden, E. F. C. Young and E. B. Gaddis are said to be the holders of the pool.

PITTSBURGH, LISBON & WESTERN R. R.—Under this name combination is reported of the Pittsburgh, Lisbon & Western Ry. and the Salem and Shenango & Beaver Valley lines. Of these properties the Salem is in operation between Salem and Washingtonville, Ohio, seven miles, and the Pittsburgh, Lisbon & Western runs from New Galilee to Lisbon, Ohio, 25 miles, making connection into Pittsburgh over the Pittsburgh, Fort Wayne & Chicago. The Pittsburgh, Lisbon & Western was taken over by Myron T. Herrick of Cleveland, last spring. (March 28, p. 236.)

PORT JERVIS, MONTICELLO & NEW YORK.—Action for foreclosure against this company having been brought some time ago by the Central Trust Co., of New York, and no answer or demurrer having been made by the defendants, Justice Dickey has confirmed the referee's report and ordered the property sold at Port Jervis, with $250,000 at the upset price. The mortgages cover lands, rolling stock, franchises and other property, in addition to the railroad, which runs from Port Jervis to Summitville, N. Y., a distance of 22 miles.

REID'S NEWFOUNDLAND.—The arbitrators in the case against the Government rendered decision Oct. 8, in accordance with which the Reid Company is awarded a sum of $854,000. The Government, at the time when it was in financial difficulty, agreed with Mr. Reid to finish building the railroad and to take over the telegraph lines, coastwise steamship service and the dry dock at St. John's, N. F. This was ratified by the Legislature but was attacked by the opposition, and after negotiations, it was agreed that Mr. Reid, who had been prevented from turning over his property, was to receive $1,000,000 and interest at 6 per cent. until settled by cash or bonds, the bonds to be taken at 86 and to bear interest at 3½ per cent. Questions arose as to the execution of certain details of the plan.

ST. LOUIS & SUBURBAN (ELECTRIC).—At a meeting of the shareholders on Sept. 24 it was voted to increase the capital stock to $7,500,000 and to make a new mortgage to secure an equal amount of 20-year 5 per cent. bonds, of which $2,300,000 are to be reserved to retire outstanding indebtedness. It is proposed to spend approximately $1,000,000 in rebuilding the line and in new equipment. At present about 40 miles are operated and extensions are now in progress.

TENNESSEE CENTRAL.—As a result of legal proceedings instituted in the name of the Mississippi Valley Trust Co., the Campbell Branch R. R., which is a short line used by the Clear Creek Coal Co., was sold Oct. 1 to the above.

TERMINAL ASSOCIATION OF ST. LOUIS.—A meeting of the stockholders has been called for Dec. 10 to take action upon a proposed increase in capital stock from $12,000,000 to $50,000,000, and a similar increase in bonded indebtedness. Of the new issue $14,000,000 will be reserved for future requirements and the balance used to pay for the Interstate Car Transfer, Terminal Belt and Wiggin's Ferry properties. The Wiggin's Ferry Co., besides its floating equipment, owns freight yards and 12 miles of terminal tracks in St. Louis. (July 25, p. 600.)

UNION PACIFIC.—The *Commercial and Financial Chronicle* says that the contest between the interests back of this company, on the one hand, and Senator W. A. Clark and the San Pedro, Los Angeles & Salt Lake, on the other, regarding the Salt Lake-Los Angeles route, appear to have been settled, although the terms have not as yet been made public. The current report to the effect that Senator Clark will buy the Oregon Short Line between Salt Lake and Calientes, Nev., 348 miles, is denied.

VICTORIA & SYDNEY.—The Victoria Terminal & Sydney Railroad & Ferry property was sold at Victoria, B. C., Oct. 4, to A. Guthrie, of St. Paul, representing the Great Northern, and to John Hendry and John Jeffry, of Vancouver. The property includes the terminal railroad at Victoria, with its rolling stock, the 17-mile railroad between the points named, in British Columbia, and the ferry between Sydney and the mainland, but does not include the steamers "Strathcona," "Unicorn" and "Iroquois."